which will be used to described the account, a Field which is a descriptive name for the contents stored in the record, and a Field Information Group Disclosure Policy Assignment List (PAL). The PAL provides rules for the disclosure of the information in the associated row in the Field column. The following list are possible PAL entries:

ALL:	may be disclosed to any requesting entity
EXPLICIT APPROVAL:	the Entity associated with the account must provide input approving the disclosure of the information
NONE:	Do not disclose this information to any other entity
M:	where M is a integer from 1 to N indicating a Information Group Disclosure Policy which may consist of a list of contacts, friends, groups, characteristics, and the like.

Most of the fields in Figure 11 are self explanatory and typical in the industry such as the account number, however a few fields are worth a clarifying discussion. The Device identifier is in record index 2, with a Identifier type in record 4. The identifier type can define what type of identifier the device associated with this account would use. Record index 10 is the Entity Type Field. This describes is the entity is a Merchant, Individual, or if the device associated with this account is a broadcast only device.

Referring now to Figure 12 a timing map reference for scanning times and dormant times for devices is shown. In one embodiment, it is desired that the power consumption and scan timing for the devices in a cellular network be reduced. Since the server and the WWAN is involved with all mobile devices, coordination of the broadcasting periods and the searching periods for the short range radios is possible. This can be based on a common reference time such as that provided by most cellular systems, any the time of day clocks inherently within mobile devices. This allows for

reduced power consumption and other resource consumption in the devices. If no coordination is achieved, then the short range receivers in each device must be scanning for transmitted identifiers much more often and for longer durations. Utilizing a common timing base, and the central server to notify the devices of a coordination approach for "active times" and "non-active times" and will allow for the devices to minimize the power consumption in the transmission of and scanning for identifiers. This approach also allows for synchronizing the update of each device's identifier (as described previously) to enhance anonymity and security, coordinated with the central server. The "non-active times" may be used as "boundaries" over which the changing identifiers may be updated. This update may be based on either direct communication with the server, or rule and algorithm based updates previously coordinated with the central server so as to minimize server messaging, but allowing the updates to remain synchronized to the server such that the device and the server are always associating the same identifier between them.

As will be recognized by an individual skilled in the area of information technology, the concept of a central server may well be implemented as a collection of servers to allow for load balancing, redundancy, and the like in a manor common to the information technology industry.

Figure 13 shows a diagram of functional blocks associated with the management of dynamically assigned device identifiers. The Server 1301 has an application agent called an Identifier Manager (1303) which has access to a pool of device identifiers (1302). The Identifier Manager monitors timing information and determines when it is time to update a particular device's identifier. This time may be a regular interval, or a random generated time period by an algorithm such as a pseudo-random sequence generator, or a combination of both. When it is time to update a device identifier, Manager 1303 retrieves a new identifier form the pool 1302. The pool of identifiers may be a list or range of identifiers, or generated algorithmically. The new identifier is stored in the account associated with the entity determined to require updating and a message sent to the device 1305 associated with that account commanding it to update

its device identifier with the new one. This messge is sent over the WWAN Data network 1304 such as IS-2000, HSPA, GPRS, IS-95, Edge, Wi-Max, and the like. All devices 1305 to 1307 will eventually all be updated in a similar manner. This update process does not disrupt ongoing communication and interaction between devices despite the update as the communications are preformed based on the identity of the entities following the detection of the device identifiers which are no longer utilized. This unique capability allows for the updating process to be implemented and not impact the applications being utilized concurrently.

Other example applications utilizing still other embodiments follow below.

Requiring the brokering of the communication via a central server can also allow a mobile device to receive information associated with a "broadcast only" device, such as in the museum example discussed previously. This is important, as such broadcast devices can enable a vast set of new applications built upon the infrastructure developed in this application, beyond the museum application. Some of these applications may involve an electronic commerce aspect, for example.

Electronic Commerce Applications

Ecommerce between a fixed broadcast device and a mobile device

Football stadium example

An embodiment of a transaction model, enabled by the infrastructure described above can be an event such as a concert, or sporting event (particularly when it is an indoor venue where no GPS is available). A number of the broadcast only devices are placed through out the seating areas. The devices are very short range, and only transmit intermittently and as a result may be battery powered and to remain active over a very long time period. Each device can be placed in a known location, in a predicable manner.

An attendee at the event has his or her device enabled with the identifier protocol and other embodiments described above. The device detects a broadcast device, and interacts over the internet with the server via the WWAN connection (as already described above). The server receives an indication of the broadcast device's identifier and the identifier of the account associated with the device which detected the broadcast device. The server retrieves content associated with the service provider's account and provide that content to the application on the requesting mobile device. The content may indicate that the venue has a product delivery service. The user may then press an indication on their device that they would like to see a menu or list of items for sale from the merchant(s) in the venue. The application on the user's device would then allow them to see a menu, for instance, and select items to purchase. The user then would be asked to confirm the purchase. The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. In this case, it is expected that a delivery fee could also be charged for the enhanced service. The server would facilitate the purchasing of the goods or services from the merchant and payment from customer's account, and provide confirmation to each. Such confirmation can include an electronic receipt provided to the customer, for user upon arrival of the delivery person of the good or service. The customer can then select an indication on their device confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition. Optionally, the delivery person of the good or service may have an enabled mobile device as well. In this case the identifiers may be detected by the customer's device and reported to the server to confirm that the provider's delivery person was present. Further, the delivery person's device can be able to detect the broadcast device's identifier and reported to the server confirming the delivery person was in the correct area independently. Even further proximity confirmation may be achieved by the customer's device's transmitted identifier being detected by the delivery person's device and reported to the central server further confirming the physical proximity of the parties involved in the transaction. Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. These cross confirmations can

allow for the central server evidence to justify payments both in completed transactions and in disputed or failed transactions. Further, the delivery person may receive a picture of the requesting customer assisting to identify the customer to whom the food is to be delivered. Once the customer is found, the delivery person can confirm the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server. The customer can have the option to report confirmation or denial of the reception of the product or service as well, as in the last example.

In another embodiment, the merchant device may be fixed, but have an internet connection (wireless or otherwise). Further, in some embodiments, the merchant may be an automated device such as a vending machine. In such a model, a customer may use their enabled cell phone to purchase an item such as a beverage from the machine without the need to insert currency into the machine. This can be accomplished by the customer's cell phone detecting the vending machine transmission of the identifier or visa-versa. Following the detection of either the customer's identifier by the vending machine, or the customer detecting the vending machine identifier, the respective device notifies the server, which in turn provides notification (assuming the account settings allow for notification) to the potential customer via their device. Assuming the customer selects to purchase an item from the vending machine using their account associated with their device, the customer may be presented a menu as in the example above. The customer may further be presented information to ensure the identity of the vending machine, such as a description of the machine, a machine identification number, or a (most likely) a picture of the machine where it is located. The customer can then confirm this is the machine they are interfacing with, and select to pay via their account. The customer may in one model select the item to dispense by input to their phone, or they may simply select to provide payment to the machine allowing them to make the selection manually as is the typical mode of operation today. The vending machine can then interact with the server via its own internet connection, and

participate in the transaction in a manner similar to the mode described above allowing for step by step confirmation as previously described.

Electronic opinion polling, tied to a known location.

In a much simpler example, such a capability might be used to tie a survey to a known location in such a way as to provide an e-coupon to the survey taker on their device in return for completion of the survey. Alternatively, this type of interaction can enable a very large crowd to interact with a Jumbo-Tron like display to provide input to polls or to participate in group activities. Users at different locations in a audience may form teams and interact with other teams for group activities.

Feature Summary of Preferred Embodiments

1. In a first embodiment:

One device is transmitting a wireless identifier using a wireless protocol capable of peer to peer communication;

The wireless identifier being associated with a specific account on a server connected to the internet;

A second device receiving the wireless identifier

The second device capable of communicating with the server over an internet connection;

The second device requesting information from the service associated with the first identifier

- The second device having a second identifier associated with a second account on the server; and/or

- The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts

The identifiers associated with the accounts being updated such that the identifiers would no longer be recognized as being associated with specific accounts without past or current interaction with the server ;

Using one or more of Cellular network timing information, and information form the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption); and/or

Data necessary to engage in an E-commerce transaction may be exchanged as well such as the identity verification such as via a picture and/or mutual identifier detection.

2. In a second embodiment,

A device is capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and using the second wireless protocol to communicate with a remote server, where:

a. One or more of the devices are mobile devices;
b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol;
c. Where the first wireless capability used for detecting the presence of another device, or advertising the presence or a device;
d. Utilizing a wireless wide area data link from one or more of the wireless devices to, optionally:
    i. Connect to a central server;

ii. Perform user authorization functions;

iii. Perform download of information associated with account identifiers utilizing the short range wireless capability;

iv. Request forwarding of messages / packets to the other active account;

e. Utilizing the messaging with a mobile proximity based social networking capability; and optionally,

i. The messaging being performed via the WWAN; and/or

f. The server providing a centrally assigned user identity, with relationship brokering or identification capability.

3. In another embodiment,

A central serving capability is provided to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server where

- the information passed to the central server is collected by one wireless device from another wireless device via a separate local wireless reception from the other wireless device;
- the separate local wireless reception from the second wireless device contains information directly assigned by, derived from, or known to the central server associated with the identity of the second wireless device;
- this identity is related to certain information and preferences of an account holder associated with an application operating on the second wireless device;
- the application is operating on both wireless devices;

- the application operating on the first device also provides its own identifying information to the central server as well as detected identifiers from devices with applications on them;
- The central server contains account information registered to the applications running on each wireless device;
- The preferences associated with the account information also contain policies related to the disclosure of one account's stored information to other accounts and hence to their application on their devices;
- These policies including a classification of other accounts each classification having different policies some of these policies being one of:
  - no not allow notification of my presence
  - allow notification of my presence
  - disclose my name/ do not disclose my name
  - disclose age / do not disclose age
  - disclose personal details;
- Where an application running on each device can optionally perform point of sale transitions coordinated via the central server, over the WWAN, utilizing user input on each device as confirmation of successive steps in the transition;
- Further, where at least one of the confirmation steps additionally involves displaying an identifying picture related to one of the devices, on the other device;
- Additionally the server performing an authorization for the transition to a third party;
- Or, optionally, a device is interacting with a point of sale device to associate an itemized list of items with a detected second device;
- The service performing a confirmation with the application on the second device requiring user input that the bill of goods list is correct; and/or

- The server storing the information related to the second devices detected account identity and inventory in a database for later use

4. In still other embodiments, a device in the present invention has a wireless capability with no WWAN capability, but only with the ability to broadcast a unique identifier, and

- A central server stores having the broadcast device's details;
- And when the first device provides these detail to the server, authorized and current information about the broadcast device are provided to the first wireless device;
- Where this information optionally includes advertising information or information related to "e-coupons" for special offers for products or services; and/or
    - Where the content of the e-coupons might be customized based on the identity of the requesting device or account holder;
        - Where the content is further customized based on other information known by the server related to the user's account ; or
        - Where the other information is related to the user's past purchasing practices or previous requests; and/or
- A mobile device, upon detecting a broadcast device and if enabled to do so, will report that broadcast Id to the server over a WWAN, and retrieve the current content from the server associated with that device and:
    - Display it to the user on their device; or
    - Execute instructions associated with the information retrieved from the server.

5. In still further embodiments, a good or service delivery model utilizing the above described broadcast device, is placed in a known location, and further

a. A mobile device is for detecting the fixed device's identifier via the WPAM/WLAN;

b. The mobile device reporting this identifier and passing an identifier associated with itself, or the account associated with the user utilizing the device;

c. The server determining that the detected broadcast device is associated with the broadcast device with a known location;

d. The server further determining that the identifier is associated with a service, and further associated with an account or that service;

e. The server retrieving content associated with the service provider's account and providing that content to the application on the requesting mobile device;

f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items, which can be implemented in java code, xml, simple text, or other for example optionally including active code elements;

g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items;

h. A user providing selection of one or more of the items, and confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device;

i. The server facilitating the purchasing of the goods or services from the merchant's account and the customer's account, and providing confirmation to each. Such confirmation including an electronic receipt

provided to the customer, for user upon arrival of the deliverer of the good to or service;

j. The customer confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition; and/or

k. The deliverer of the good or service optionally having a mobile device and optionally:

i. such that identifiers from that device may be detected by the customers device and reported to the server to confirm that the provider's delivery person was present;

ii. such that the broadcast devices identifier is detected by the delivery person's mobile device and reported to the server confirming the deliver person was in the correct area

iii. such that the customer's device's transmitted identifier is detected by the delivery persons device and reported to the central server further confirming the physical proximity of the parties involved in the transaction; and/or

iv. The delivery person confirming the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server.

6. In another embodiment, a software program is arranged to operate at the application layer on a mobile device, which interfaces to a device driver interface:

- Using wi-fi 802.11 to perform a WLAN local connection protocol; or
- Using Bluetooth to perform the WLAN local connection;
- Where the device driver interface is an NDIS driver or the like;
- Using 1xEVDO, HSDPA, GPRS, EDGE or the like for a wide area WWAN interface;

- The application then providing the reported identifiers to a server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers;
    - The decision process optionally based on priority of the identifier, the class an identifier belongs to, a list the identifier is, or is not included on;
  - Based on the result of the action function,
  - Sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information back from the server related to that identifiers' account information stored on that server;
  - The server then receiving a request from a device's application, with a detected identifier
    - The server examining both the requesting and the requested identifier's identity and making a policy decision regarding the release of the requested identifiers information related to their account;
    - The server in some cases providing a continuously or periodically changing account or device identifier to a specific application on a device to enhance the privacy of the identity of that device;
      - The changing of the identifier may be effected by a rule based generation local to the application, or may be downloaded from the server directly; and/or
      - The update of the identifier being synchronized to such that it is coordinated with predetermined scanning and broadcasting periods allowing for a known update boundary;

7. In still another embodiment, a method uses the mobile device's time of day derived from the network or other reference for

synchronizing a PAN/WLAN discovery and advertisement times to save battery life;

doing the same in a synchronized way among multiple devices;

while coordinating the timing information utilizing the WWAN and a central server available commonly to the devices, such as by

- Synchronizing identifier transmission timing to save power from WWAN network parameters obtained for the server;
- Coordinating any identifier updates to this same timing source; and/or
- Using a pool of identifiers available to the central server to assign identifiers to devices changing the identifiers at some time interval derived for the common time reference

8. In another embodiment,

A central server uses an identity manager to assign identifiers to devices using a WWAN cellular data link, and wherein

identifiers are occasionally changed

identifiers are assigned from a pool of identifiers available to the servers;

identifiers are used as 48 bit media access control (MAC) addresses of the short range wireless network adapter

identifiers are optionally used as

an SSID in a IBSS in IEEE-802.11 network beacons

a BSSID of the IEEE802.11 network adapter;

in a IEEE802.15.1 Inquiry Response Message as the BD_ADDR

a device name in a Bluetooth name response packet ; or

listed in a services list as provided in a LMP_features_req message or LMP_features_req_ext message for a Bluetooth device

While this invention has been particularly shown and described with references to example embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

CLAIMS

What is claimed is:

1. A method for a central server to exchange information between one or more wireless devices executing applications, the central server performing the steps of:

receiving identifier information, as collected by a first wireless device from a second wireless device via a local wireless link between the first and second wireless devices;

wherein the identifier information is associated with one or more of an identity or related information concerning an entity or object located in proximity to the second wireless device; and

storing identifier information and one of identity information or other related information of the entity or object in proximity to the second device; and

subsequent to the step of receiving the identifier from the first device, taking further action by the server to deliver information or a service to the first wireless device.

2. The method of claim 1 wherein the information or service delivered to the first wireless device is associated with the entity or object that is located in proximity to the second wireless device.

3. The method of claim 1 wherein the information delivered from the server to the first wireless device includes at least one of

advertising information;

information relating to products or services; and/or

information related to e-coupons.

4. The method of claim 3 wherein content of the e-coupons is customized based on at least one of:

an identity of the requesting first device or associated account holder;

other information accessible to the server related to the account holder; and/or

past purchasing practices or previous requests of an account holder.

5. The method of claim 1 additionally wherein

the first wireless device, upon detecting proximity of a second wireless device, further performs the steps of:

reporting an identifier of the second wireless device to the server over a second wireless link, the second wireless link being a wide area wireless link, and

retrieving current content from the server associated with that device; and optionally:

displaying content to the user on their device; or

executing instructions associated with the information retrieved from the server.

6. The method of claim 1 wherein a service is associated with the second wireless device and the server further performs the steps of:

receiving an identifier associated with the service;

determining that the detected second wireless device identifier is associated with a service, and further associated with an account for that service; and

retrieving content associated with an account for the service provider and providing that content to the application on the first mobile device.

7. The method of claim 6 wherein the content may one or more of a list of items for sale, services for sale, a opinion poll, food menu, or other content which allows for user selection of items.

8. The method of claim 7 further comprising:

receiving information indicating a user selection of one or more of the items,

confirming that a user wishes to purchase said items; and/or

initiating delivery of a good or service at or near a location proximate to the second wireless device.

9. The method of claim 1 further comprising:

facilitating the purchase of the goods or services from a merchant account associated with the second wireless device and a customer account associated with the first wireless device;

providing confirmation to each account; and/or

receiving customer confirmation of receipt of a good or service via the first wireless device, thereby completing a transaction.

10. The method of claim 9 further comprising:

detecting an identifier at a customer wireless device and reporting the same to the server, the detecting step used to confirm that a service provider's delivery person was present;

a further detecting step, carried out at a delivery persons wireless device, such that an identifier is detected by the delivery person's wireless device; and

reporting to the server, also carried out at the deliver persons wireless device, confirming the delivery person was in a correct area for delivery.

11. The method of claim 10 additionally comprising:

confirming the delivery of the good or service to the customer via user input on a wireless device; and

reporting that confirmation to the central server.

12. The method of claim 1 further comprising:

receiving confirmation at the first wireless device;

sending a message to the second wireless device to thereby provide access to an entity or object located in proximity to the second wireless device.

13. A method as in claim 1 wherein a wireless device has time synchronization information derived from a network time or other reference, and that information is used to synchronize time periods and, optionally, one or more of the steps of:

coordinating the timing information utilizing a network time and a time from the central server made available commonly to the first and second wireless devices;

transmitting of identifiers or searching for identifiers using parameters obtained for the server; or

coordinating identifier updates to this same timing source.

14. A central server to exchange information between one or more wireless devices executing applications, the central server comprising:

a receiver, for receiving identifier information, as collected by a first wireless device from a second wireless device via a local wireless link between the first and second wireless devices, wherein the identifier information is associated with one or more of an identity or related information concerning an entity or object located in proximity to the second wireless device;

a storage device, for storing identifier information and one of identity information or other related information of the entity or object in proximity to the second device; and

a transmitter, for subsequent to the step of receiving the identifier from the first device, to deliver information or a service to the first wireless device.

15. The server of claim 14 wherein the information or service delivered to the first wireless device is associated with the entity or object that is located in proximity to the second wireless device.

16. The server of claim 14 wherein the information delivered from the server to the first wireless device includes at least one of

advertising information;

information relating to products or services; and/or

information related to e-coupons.

17. The server of claim 16 wherein content of the e-coupons is customized based on at least one of:

an identity of the requesting first device or associated account holder;

other information accessible to the server related to the account holder; and/or

past purchasing practices or previous requests of an account holder.

18. The server of claim 14 additionally wherein

the first wireless device comprises a transmitter for, upon detecting proximity of a second wireless device, reporting an identifier of the second wireless device to the server over a second wireless link, the second wireless link being a wide area wireless link, and

receiving current content from the server associated with that device; and

a processor, for, optionally:

displaying content to the user on their device; or

executing instructions associated with the information retrieved from the server.

19. The server of claim 14 wherein a service is associated with the second wireless device additionally comprising:

a receiver, for receiving an identifier associated with the service; and

a processor,

for determining that the detected second wireless device identifier is associated with a service, and further associated with an account for that service; and

retrieving content associated with an account for the service provider and forwarding that content to the application on the first mobile device.

20. The server of claim 19 wherein the content may one or more of a list of items for sale, services for sale, a opinion poll, food menu, or other content which allows for user selection of items.

21. The server of claim 20 further wherein:

the receiver receives information indicating a user selection of one or more of the items,

the processor further

confirms that a user wishes to purchase said items; and/or

initiates delivery of a good or service at or near a location proximate to the second wireless device.

22. The server of claim 14 further comprising:

a processor,

for facilitating the purchase of the goods or services from a merchant account associated with the second wireless device and a customer account associated with the first wireless device;

providing confirmation to each account; and/or

receiving customer confirmation of receipt of a good or service via the first wireless device, thereby completing a transaction.

23. The server of claim 22 wherein the processor further:

detects an identifier at a customer wireless device and reporting the same to the server, to confirm that a service provider's delivery person was present;

receiving an identifier from a delivery persons wireless device; and

confirming the delivery person was in a correct area for delivery.

24. The server of claim 23 wherein the processor additionally:

confirms the delivery of the good or service to the customer via user input on a wireless device; and

reports that confirmation to the central server.

25. The server of claim 14 wherein the processor further:

receives confirmation at the first wireless device;

sends a message to the second wireless device to thereby provide access to an entity or object located in proximity to the second wireless device.

26. The server of claim 14 wherein a wireless device has time synchronization information derived from a network time or other reference, and that information is used by a processor to synchronize time periods and, optionally,:

coordinate the timing information utilizing a network time and a time from the central server made available commonly to the first and second wireless devices;

transmit identifiers or searching for identifiers using parameters obtained for the server; or

coordinate identifier updates to this same timing source.

ABSTRACT OF THE DISCLOSURE

Techniques for facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other. A first device uses a first short range wireless capability to detect an identifier transmitted from a second device in proximity, ideally using existing radio capabilities such as Bluetooth (IEEE802.15.1-2002) or Wi-Fi (IEEE802.11). The detected identifier, being associated with the device, is also associated with an entity. Rather than directly exchanging application data flow between the two devices using the short range wireless capability, a second wireless capability allows for one or more of the devices to communicate with a central server via the internet, and perform the exchange of application data flow. By using a central server to draw on stored information and content associated with the entities the server can broker the exchange of information between the entities and the devices.

Figure 1

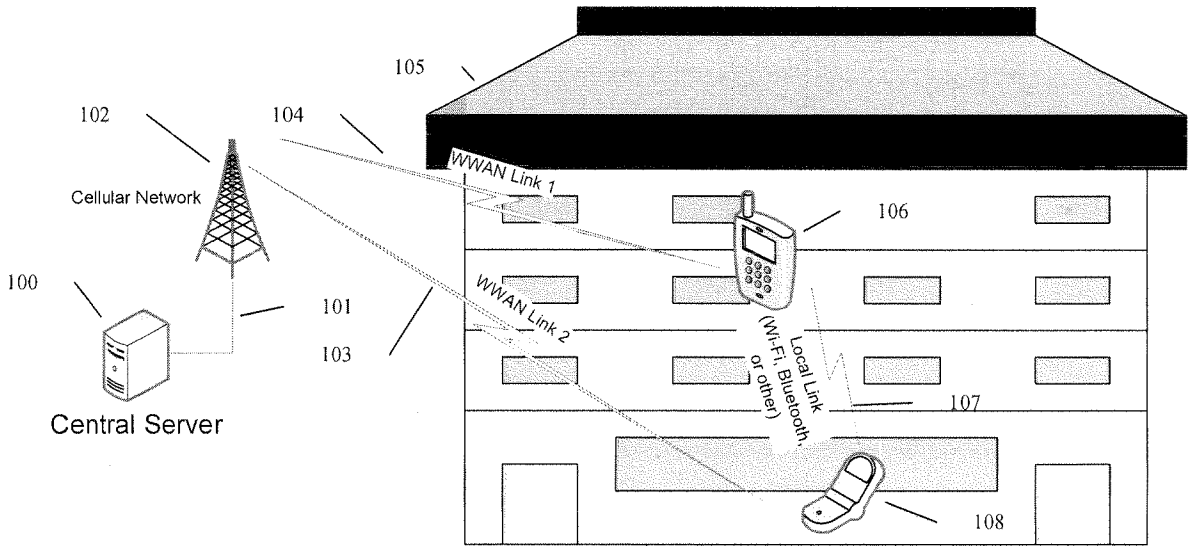

105
102
104
Cellular Network
WWAN Link 1
106
100
WWAN Link 2
101
103
Local Link
(Wi-Fi, Bluetooth,
or other)
107
Central Server
108
Building 2

Figure 2

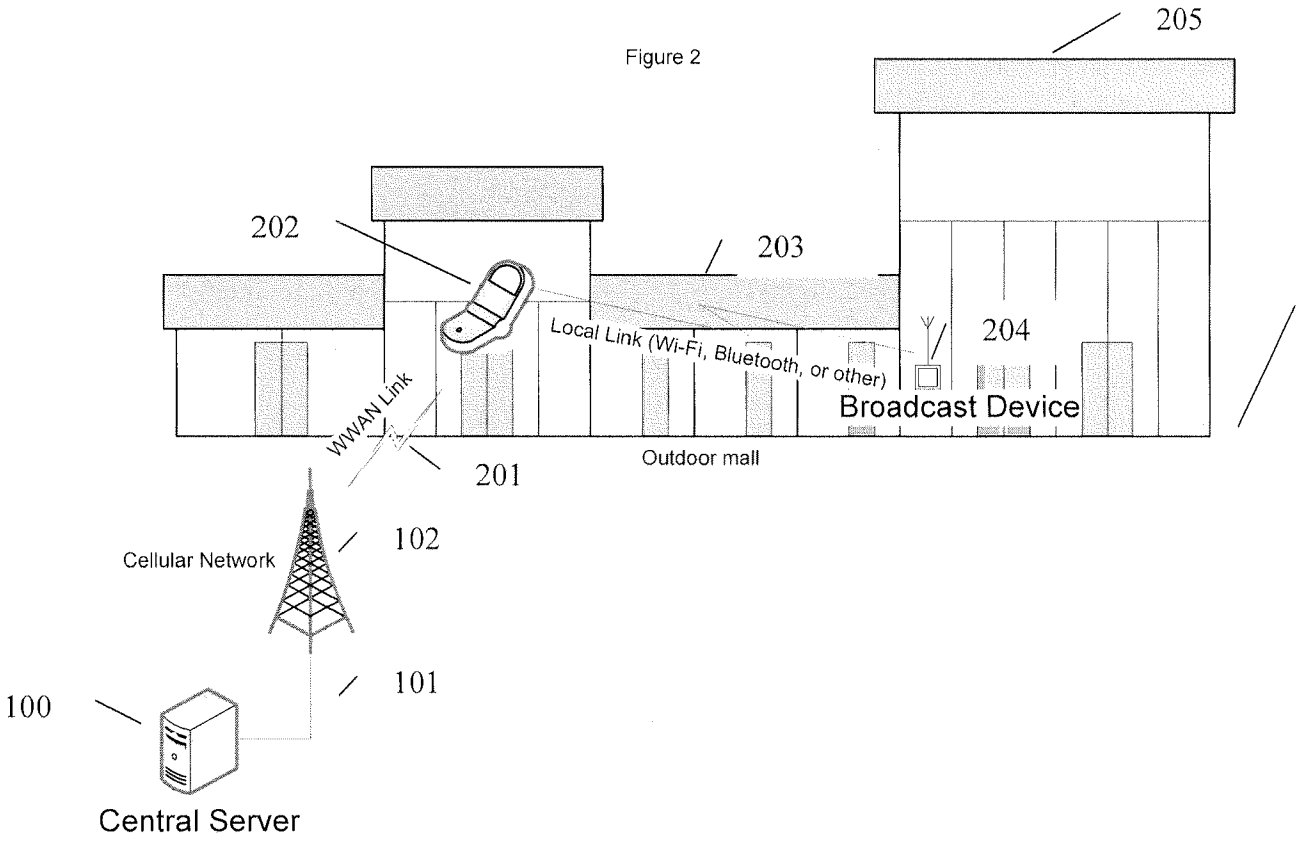
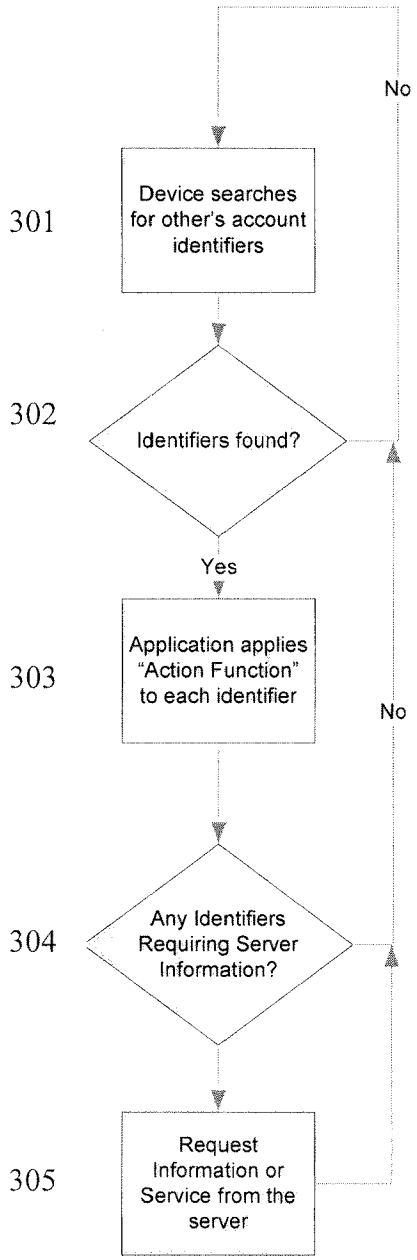

205
202
203
204
Local Link (Wi-Fi, Bluetooth, or other)
WWAN Link
Broadcast Device
Outdoor mall
201
Cellular Network
102
101
100
Central Server

Figure 3


301
Device searches for other's account identifiers
302
Identifiers found?
No
Yes
303
Application applies "Action Function" to each identifier
No
304
Any Identifiers Requiring Server Information?
305
Request Information or Service from the server

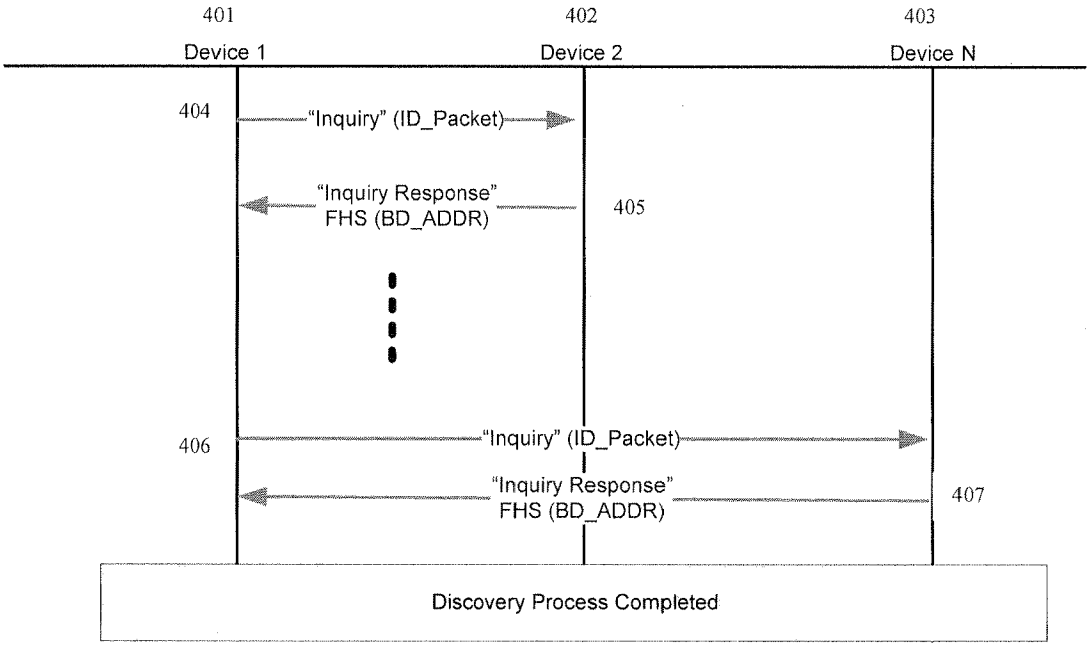


Figure 4 – 802.15.1-2002 (Bluetooth V1.2) Device Discovery

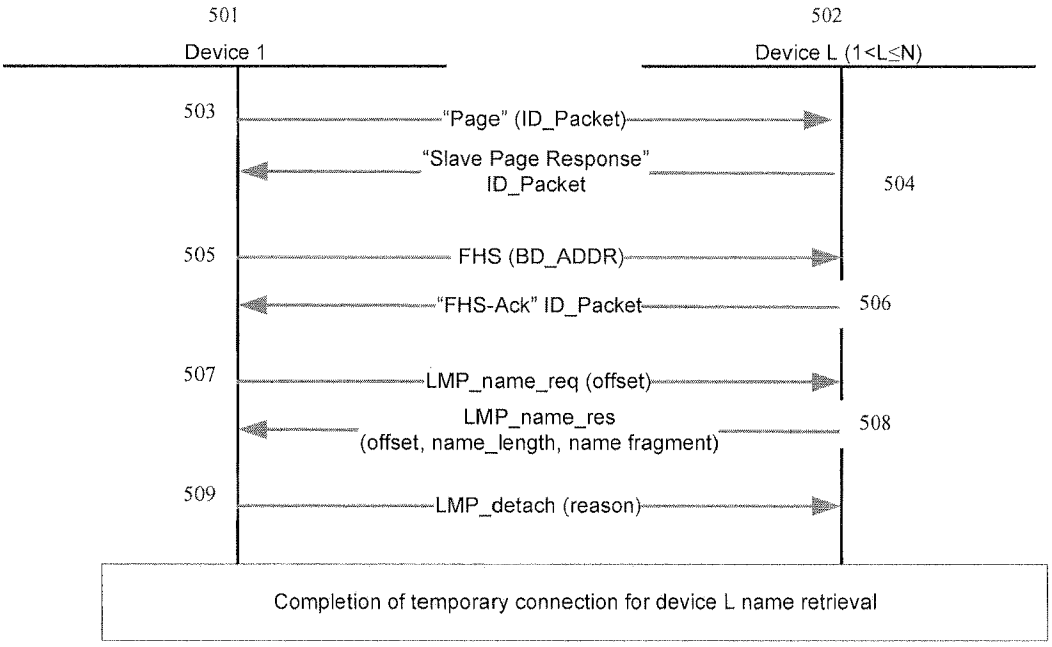


Figure 5 – 802.15.1-2002 (Bluetooth V1.2) Remote Name Request

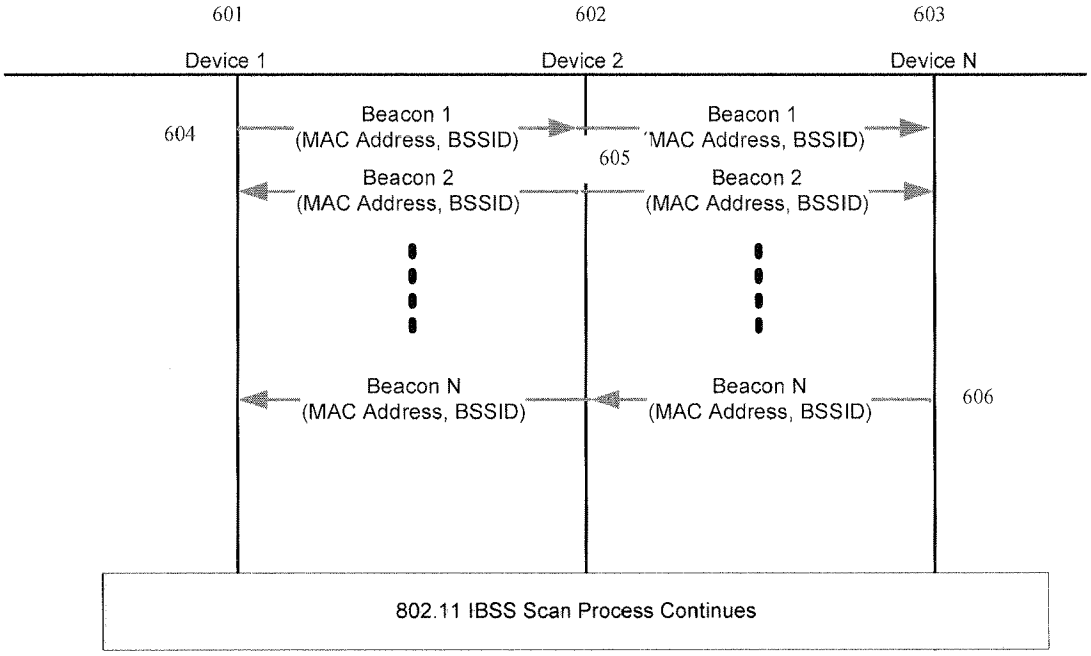


Figure 6 - 802.11 IBSS Beacon Process

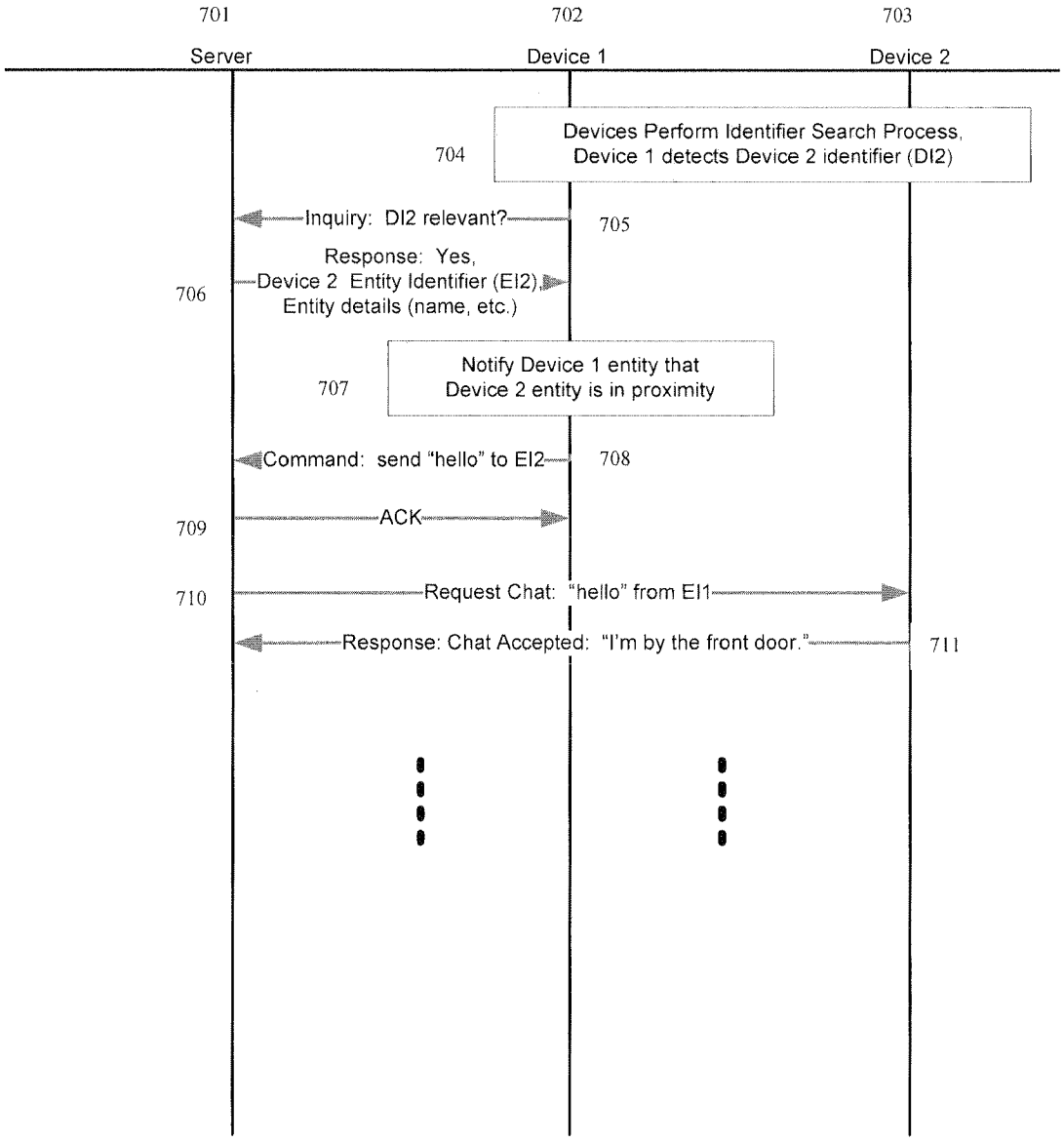


Figure 7 – Process of Detection and entering a Chat Session

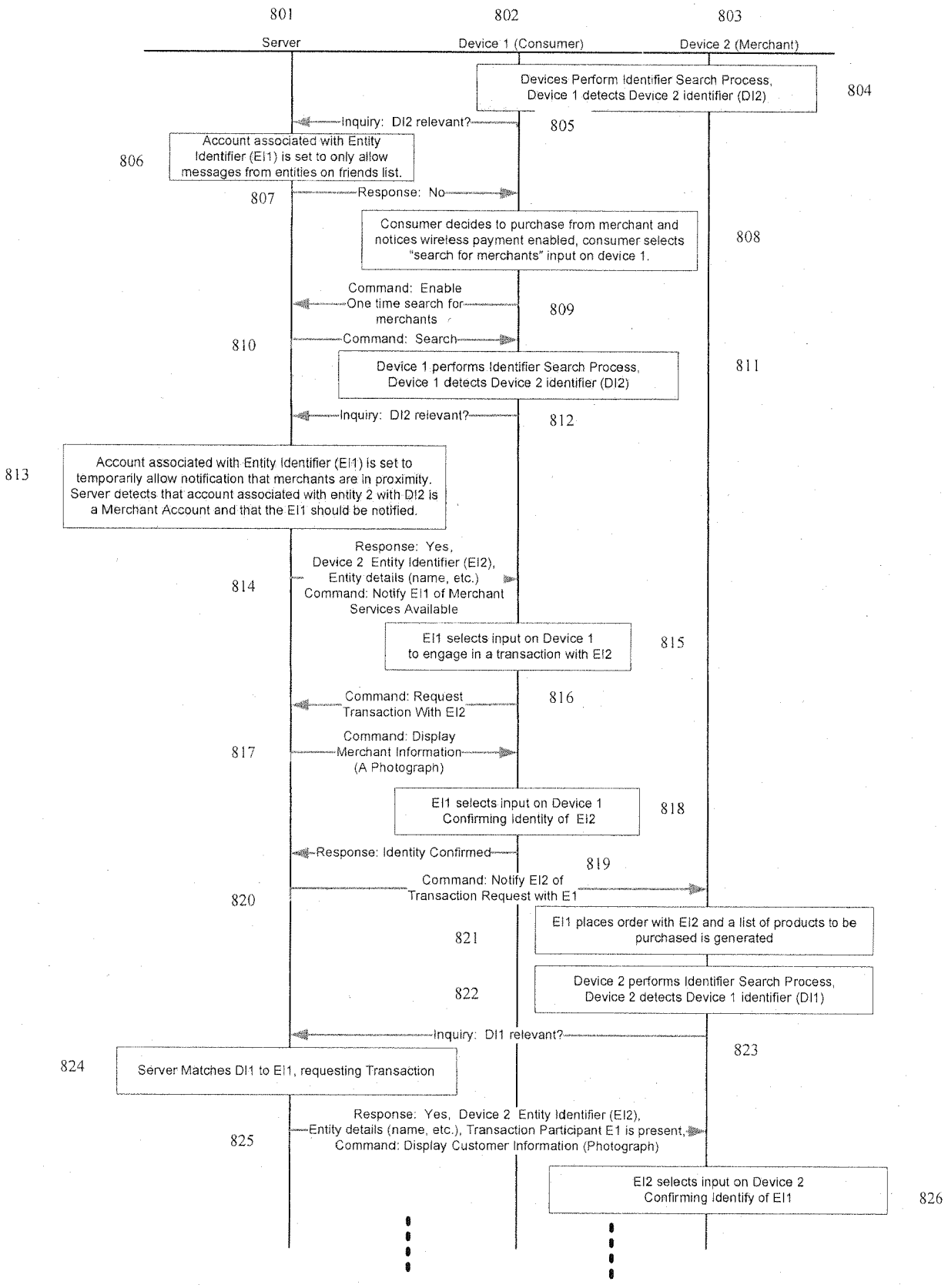
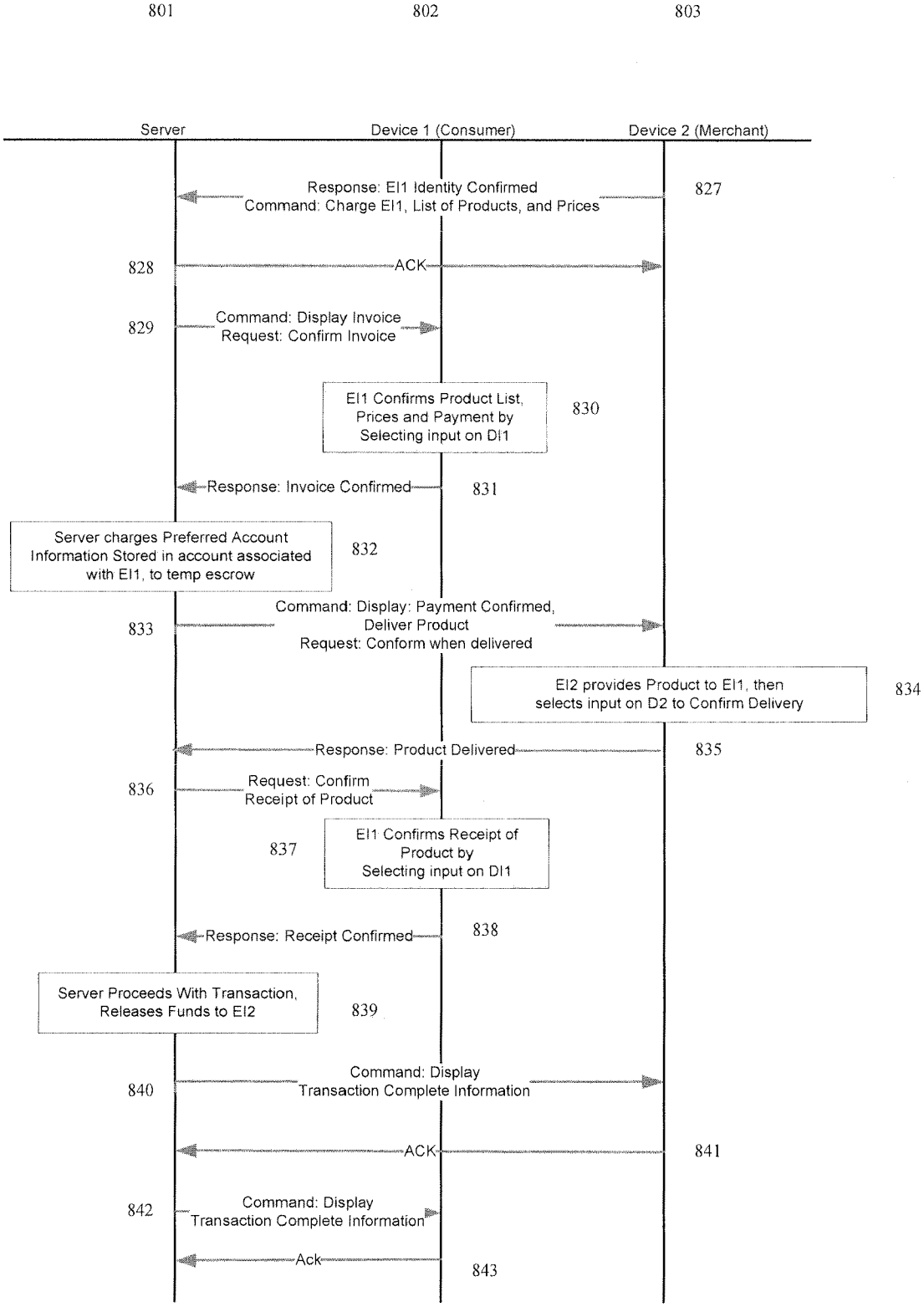


Figure 8A – E Commerce Process

Figure 8B – E Commerce Process Continued



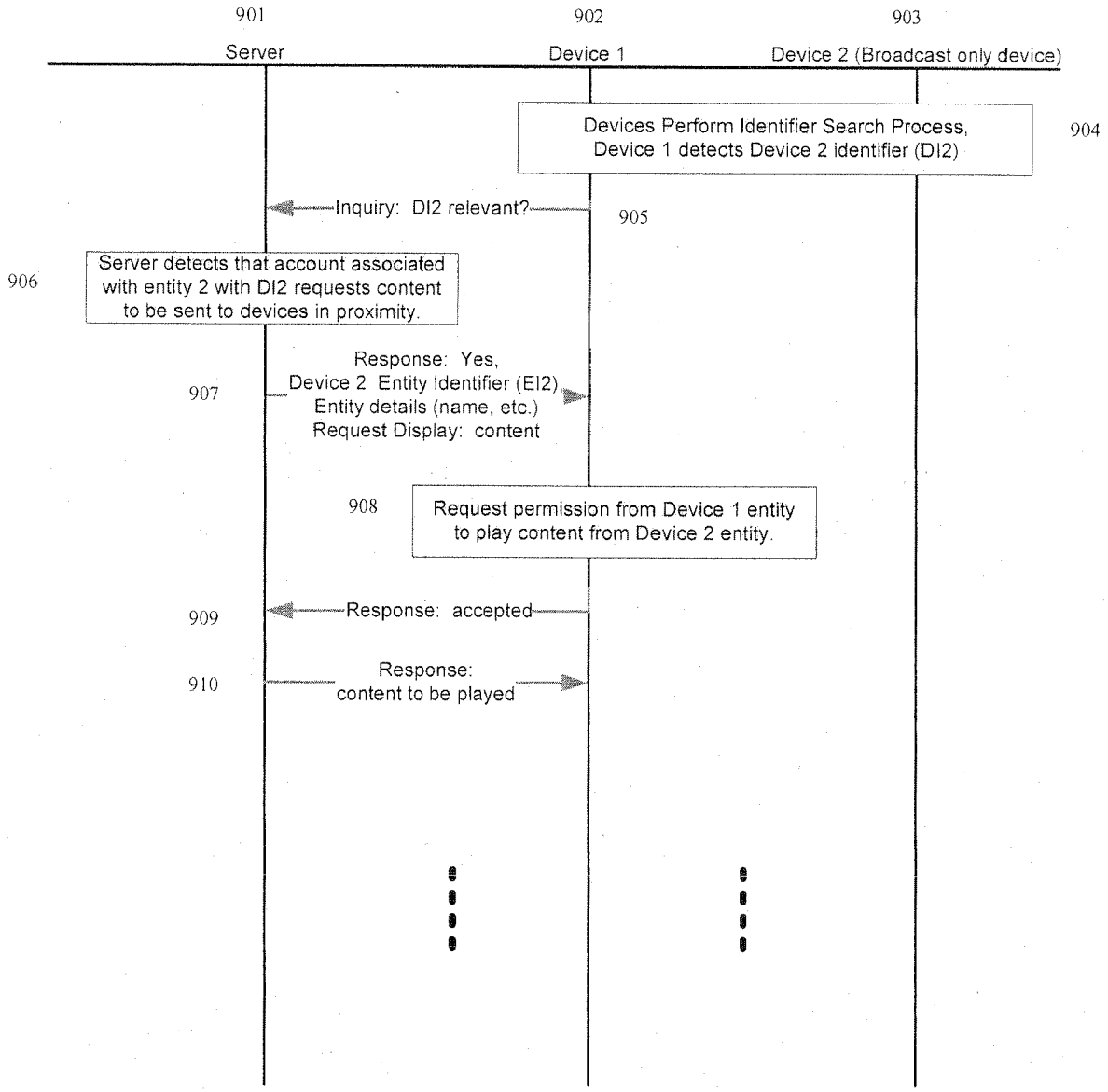


Figure 9 Broadcast and mobile device interaction

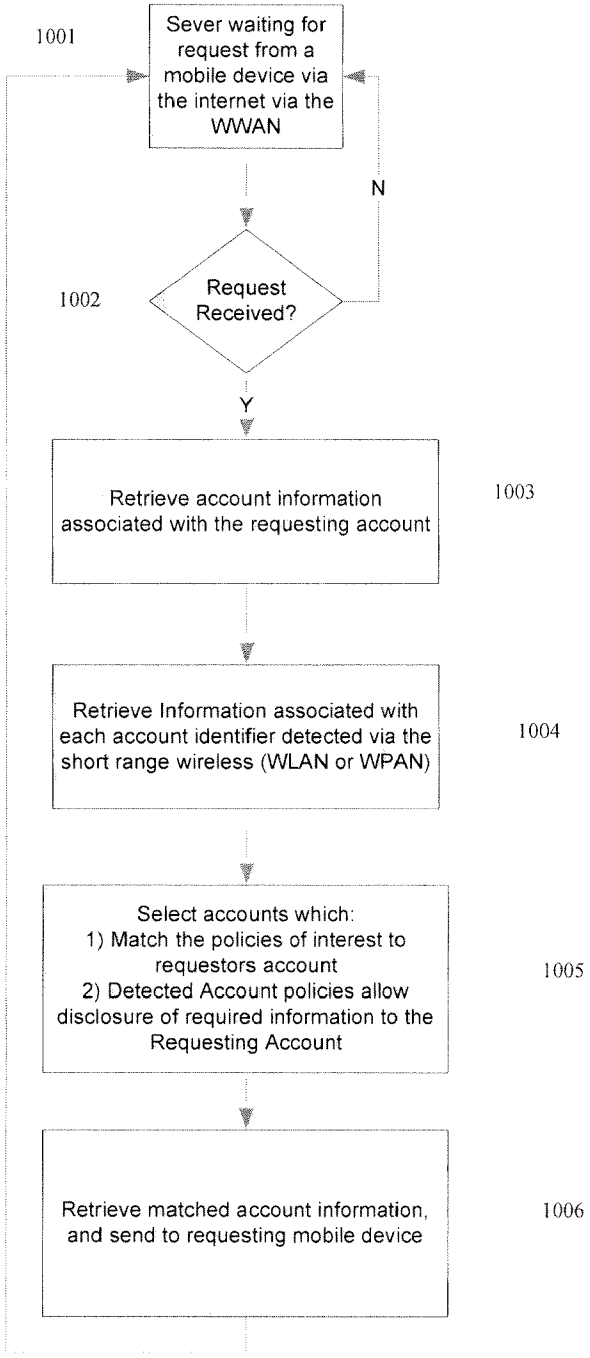


Figure 10 – Server Processing Example for Detected Device

Figure 11 – Example Individual Account Record associated with an Entity Stored in the Server

Record Index	Field	Field Information Group Disclosure Policy Assignments List
1	Account Number	{All, Explicit Approval, NONE, 1..N}
2	Identifier	
3	Identifier Type [Fixed MAC Address, Dynamic MAC Address, BSSID, Device Name]	
4	Number of Fields	
5	Field List	
6	Account User Name	NONE
7	Account Password	NONE
8	Entity Name	
9	Entity Address	
10	Entity Type [Individual, Merchant, Broadcast Entity]	
11	Billing Information	
12	Device Type	
13	Device IP Address	
14	Device SMS Phone Number	
15	Device Capabilities	
16	Entity AutoPlay Script 1	
17	Entity AutoPlay Script 2	
18	Detected AutoPlay Script 1	
19	Detected AutoPlay Script 2	
20	Entity Instant Message Address List	
21	Information Group Disclosure Policy 1 (IGDP#) [Characteristic 1 (C1), C2,.. CN, Friend List 1 (FL1), FL2, .. FLN, etc]	
22	Information Group Disclosure Policy 2	
23	Information Group Disclosure Policy 3	
24	Information Group Disclosure Policy 4	
25	Additional Personal Information Field 1 (APIF#) [Content Type/Content] (Picture, mp3, xml/AJAX, Text, Contact List, URL (MySpace, Facebook, Loopt), Login Credentials (MySpace, Facebook, Loopt, Itunes, etc.), Payment Information (Credit Card Information, PayPal Information, etc.), IM Credentials List (Username/Password))	
26	Additional Personal Information Field 2	
27	Additional Personal Information Field 3	
...		

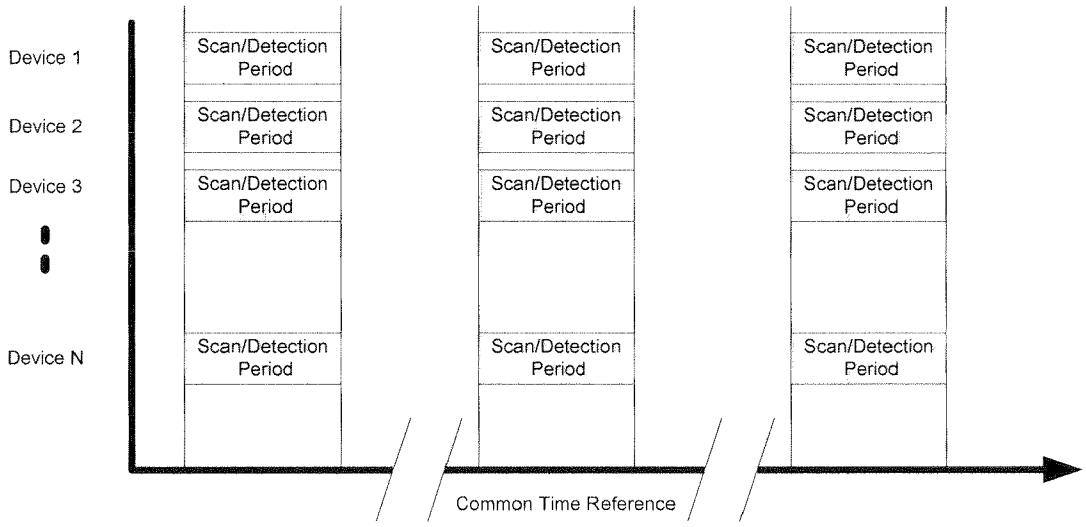


Figure 12 Use of common time reference for intermittent detection intervals

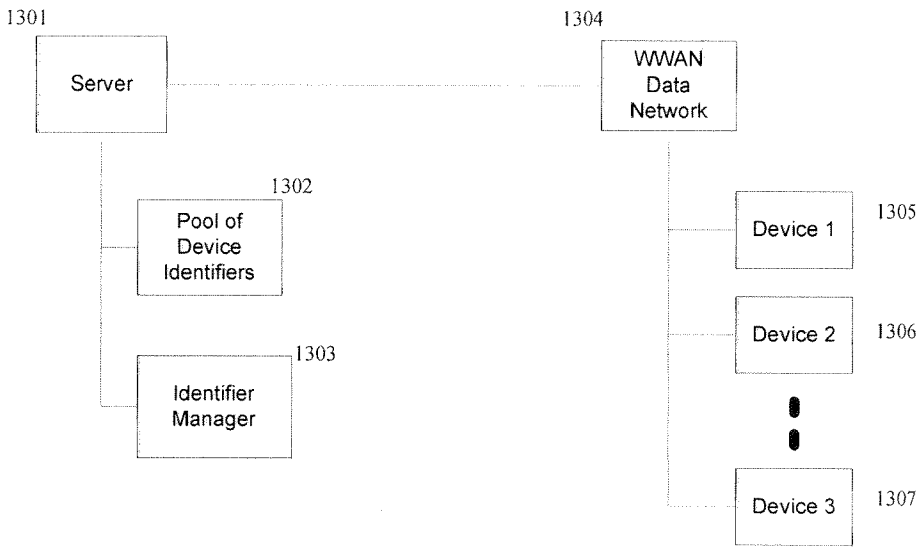


Figure 13 - Management of Device Identifiers by Identifier Manager in the Server

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
61/095,359	09/09/2008		105	PRO08-02		

CONFIRMATION NO. 9670

82506
James Arthur Proctor, Jr
258 Seaview Street
Melbourne Beach, FL 32951

FILING RECEIPT

OC000000032083356

Date Mailed: 09/17/2008

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

James Arthur Proctor JR., Melbourne Beach, FL;
James Arthur Proctor III, Indialantic, FL;

Power of Attorney: None

If Required, Foreign Filing License Granted: 09/15/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/095,359**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Central server enabled proximity based applications utilizing both short range, and wide area wireless radios

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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Doc Code: **TR.PROV**
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)
Approved for use through 06/30/2010 OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Provisional Application for Patent Cover Sheet

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

Inventor(s)

Inventor 1 — Remove

Given Name	Middle Name	Family Name	City	State	Country
James	Arthur	Proctor Jr.	Melbourne Beacl	FL	US

Inventor 2 — Remove

Given Name	Middle Name	Family Name	City	State	Country
James	Arthur	Proctor III	Indialantic	FL	US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Title of Invention	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
Attorney Docket Number (if applicable)	PRO08-02

Correspondence Address

Direct all correspondence to (select one):

◉ The address corresponding to Customer Number	○ Firm or Individual Name
Customer Number	82506

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

◉ No.

○ Yes, the name of the U.S. Government agency and the Government contract number are:

Doc Code: **TR.PROV**
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)
Approved for use through 06/30/2010 OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

Entity Status

Applicant claims small entity status under 37 CFR 1.27

(•) Yes, applicant qualifies for small entity status under 37 CFR 1.27

( ) No

Warning

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	// James A Proctor Jr //			Date (YYYY-MM-DD)	2008-09-09
First Name	James	Last Name	Proctor	Registration Number (If appropriate)	

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, t o a n other federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Figure 1

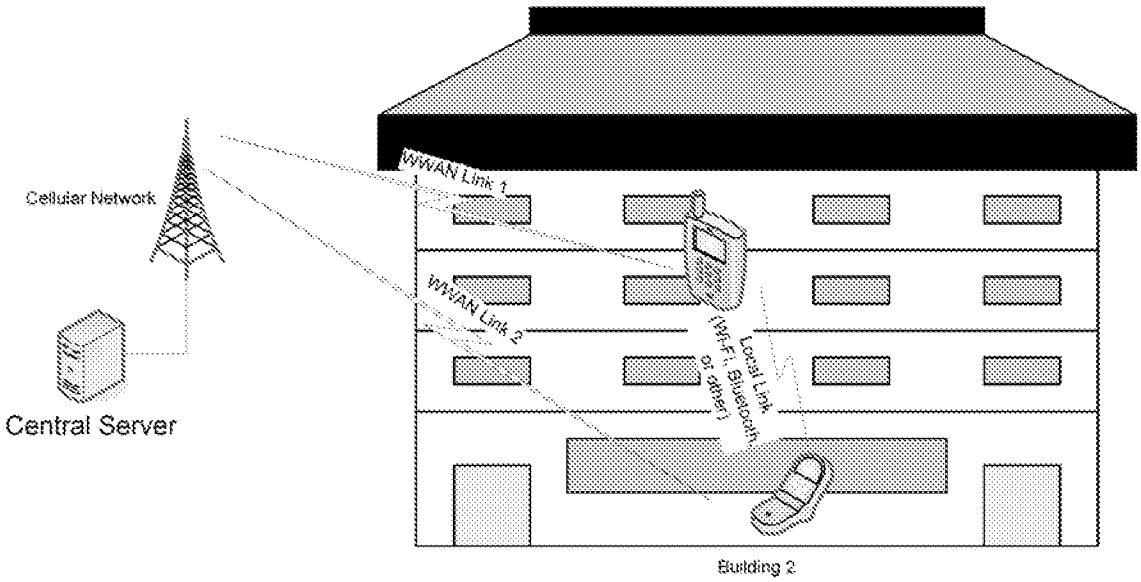

Cellular Network
WWAN Link 1
WWAN Link 2
Local Link
(Wi-Fi, Bluetooth
or other)
Central Server
Building 2

Figure 2

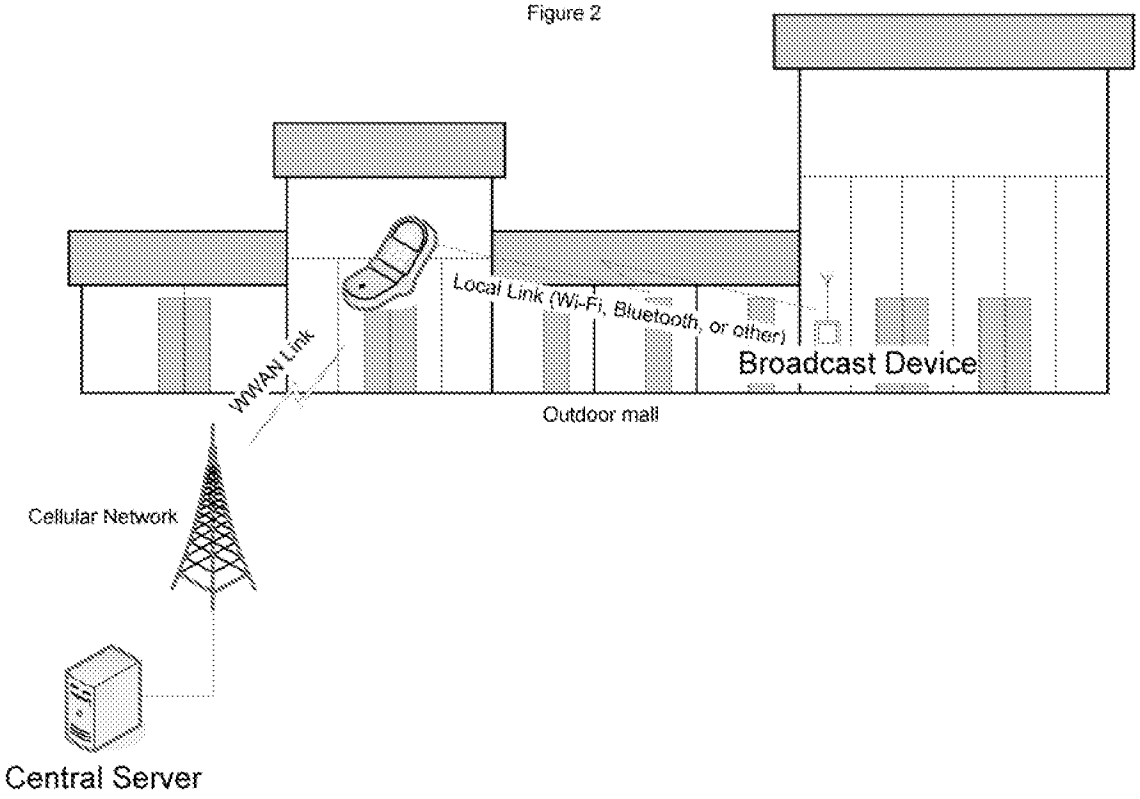

Local Link (Wi-Fi, Bluetooth, or other)
WWAN Link
Broadcast Device
Outdoor mall
Cellular Network
Central Server

Figure 3

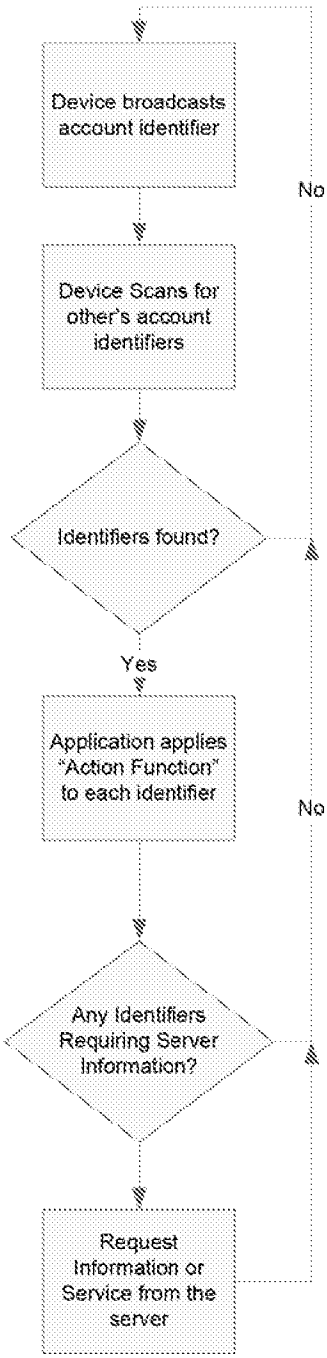
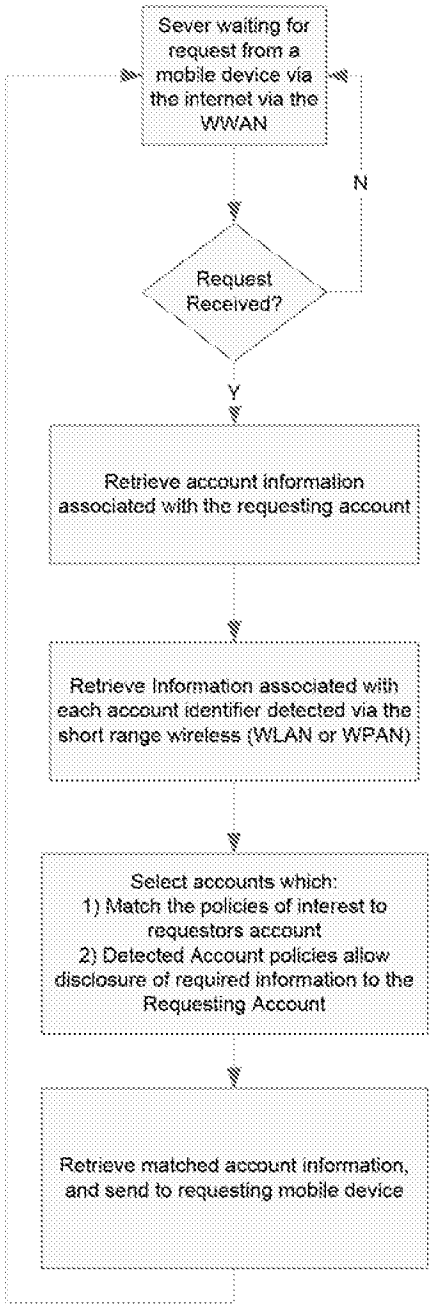

Device broadcasts account identifier
Device Scans for other's account identifiers
Identifiers found?
No
Yes
Application applies "Action Function" to each identifier
No
Any Identifiers Requiring Server Information?
Request Information or Service from the server

Figure 4 – Server Processing



Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	James Proctor
Attorney Docket Number:	PRO08-02

Filed as Small Entity

Provisional Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Provisional Application filing fee	2005	1	105	105
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**105**

Electronic Acknowledgement Receipt

EFS ID:	3909660
Application Number:	61095359
International Application Number:	
Confirmation Number:	9670
Title of Invention:	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	82506
Filer:	James Proctor
Filer Authorized By:	
Attorney Docket Number:	PRO08-02
Receipt Date:	09-SEP-2008
Filing Date:	
Time Stamp:	13:07:05
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$105
RAM confirmation Number	7508
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Provisional Cover Sheet (SB16)	ProvisionalSB-PRO08-02.pdf	1000431 fc1b23d33b92a9c1525e26830618adf5ebbdce1c	no	3
Warnings:					
Information:					
2		PRO08-02-ASFILED-09092008-IMG.pdf	5020000 48e14c5e84c225d103caa192e7d12a5fbd6e842a	yes	28

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	24
	Drawings-only black and white line drawings	25	28

Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	29249 50ab73124b92a4dba75b8a30d54604760ba85a96	no	2
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<u>National Stage of an International Application under 35 U.S.C. 371</u>
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

James A. Proctor Jr. – Invention Disclosure

Invention Disclosure:

Inventor(s): James A. Proctor Jr.

James A. Proctor III

The following are a list of potential titles for this provisional application Invention Disclosure.

Title 1:

Central server enabled proximity based applications utilizing both short range, and wide area wireless radios

Title 2:

Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection

Title 3:

Anonymity method associated with a wireless proximity detection process utilizing a central server.

Title 4:

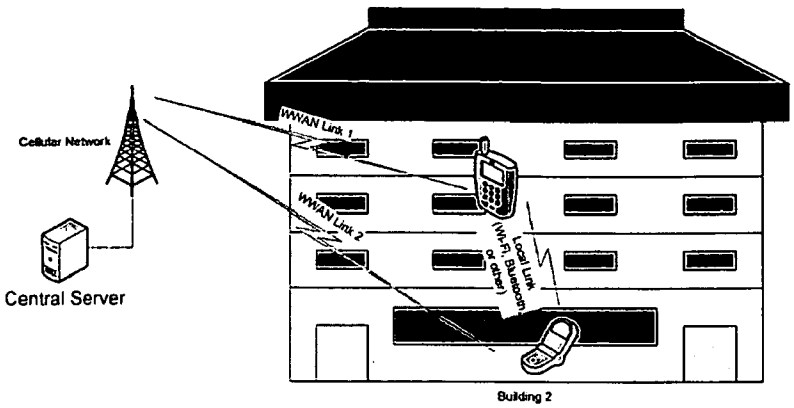
Wireless Advertising, Point of Sale, and associated infrastructure using wireless device proximity detection and a central server

Introduction:

This disclosure provides support for multiple patent applications of both a technical, and business model nature.

The present invention is generally concerned with facilitating communications between two wireless devices when they are in close proximity to each other, and using a central server to determine if one or more of the devices should be notified of the other device's presence or other related information such as advertising.

Figure 1



Description

Most mobile phones on the market today support at least two wireless standards; one for the cellular wireless wide area network connection (WWAN) and one for a wireless personal or local area network (WPAN, WLAN). The cellular connection or WWAN is utilized for voice and data and can adhere to many different standards such as CDMA (IS-2000), GSM, or W-CDMA. The WPAN or WLAN connection is typically for short range communications and is often used for wireless hands free devices, such as headsets, peripherals, or higher speed internet connections. The typical standards using for the sort range wireless communications include Bluetooth, Wi-Fi, and in some cases Ultra-Wide-Band (UWB).

Specifically, the current invention utilizes the short range wireless communication to detect the presence of other devices, and the wide area wireless network to perform communications to a central server, and perform the actual communications between the wireless devices. The distinction being that the short range wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices.

The transmitted identifiers associated with any given device are only known to the central server and the device transmitting it. These identifiers may change from time to time, making a user's or a device's identity anonymous over time. The central server and any particular device must be coordinated such that the identifier and any device is transmitting it, remains identifiable by the central server. This process is coordinated between the handset or other wireless device, and the central server utilizing the WWAN or cellular data link, carrying messaging between them. Of course, it is contemplated that the WWAN may be replaced with another internet connection such as Wireless LAN to an internet enabled gateway or access point, and the short range wireless function would be performed by Bluetooth or the like (even a wired internet connecting in some cases).

When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identifiers and request that the server provide the device with the information related to any identifier that is 1) relevant to that device, and 2) that device is authorized to receive.

The device may employ an action function, which would act as a filter that determines which of the detected identifiers should be passed to the server. This function may be omitted and all identifiers passed to the server. The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.

As an example of the overall process, a detected identifier may be relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function would work to reduce frequency of re-requests to the server.

To enable this process, each device or user associated with an identifier has an account on the server associated with the user and/or device, and the current identifier. There will be various information associated with each account. When the account is associated with an individual, there may be personal information such as the individuals name, contact information, information allowing communication, such as chat or IM, links to their other social networking services, and the like.

There will also be policy based permissions stored in the account and applied to any information associated with this account. The stored policy permissions will determine what information and under which situations information may be disclosed to another device or user associated with another account.

Just as in the case of an identifier being deemed relevant to a user based on a friends list, the permission of disclosing a device's presence may require being on a friends list as well. For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information for which the users associated with the identifiers are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows for disclose of a user's presence only to individuals on this list.

Of course it is contemplated that the permissions not be an "all or nothing", but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and chart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, but with other services available such as multi-player games. Additionally multiple contacts may be included in the account, each given customized permissions. An example would be any user may be notified of an anonymous user or other information based on additional policies.

As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies.

In this way, the central server controls the process of passing information related to an account to a particular requesting device.

A device may also simply broadcast an identifier, with no WWAN connection to facilitate advertising or local information. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, they receive an identifier. The device passes the identifier to the central server, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's device. Applications such as games, informative display applications, or content such as audio or video may be offered to the user's device as well. Other examples might include electronic coupons in a grocery store, menus or special offers in a restaurant. A process of steps, enabled by this proximity infrastructure invention, for performing a step by step electronic e-commerce transition with two party confirmations will be described later in this invention disclosure as well.

Main Enabling Infrastructure Concepts (more elaboration on in the key concepts to protect section, as well as invention disclosure associated with enabled applications...)

- One device transmitting a wireless identifier using a wireless protocol capable of peer to peer communication
- The wireless identifier being associated with a specific account on a server connected to the internet
- A second device receiving the wireless identifier
- The second device capable of communicating with the server over an internet connection
- The second device requesting information from the service associated with the first identifier
    - The second device having a second identifier associated with a second account on the server
    - The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts

- The identifiers associated with the accounts being updated such that the identifiers would no longer be recognized as being associated with specific accounts without past or current interaction with the server
- Using one or more of cellular network timing information, and information from the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption)

Prior Art:

To date the prior art has been concerned with several areas:

- Utilizing GPS to determine the proximity of one mobile wireless user to another to facilitate mobile social networking. An example of an existing application utilizing this approach is Loopt, which is a coordinates location based social interaction based on GPS.
- Using standards such as IEEE802.11 (Wi-Fi) or Bluetooth to facilitate peer to peer communications or Mesh Networking. These are also referred to a MANETs or Mobile Ad-hoc Networks.
- Using peer to peer networks to facilitate communication between wireless devices. Examples of such existing applications include Mobile-Cheddar, Peer-2-Me, and Flobbi.

The present invention differs from these approaches in that first, no GPS is used to determine when one device is in proximity to another, as GPS will often not operate indoors where the GPS signal is weak

Secondly, utilizing a peer to peer based network, supporting an application such as social networking, the information flow between the devices running the applications are carried over the peer to peer network itself. An example of this is a service called Flobbi, where community members can identify each other via Bluetooth transmissions, then interact with chat. The messaging in this case is carried over Bluetooth itself. This approach creates complexity in a handset, and unnecessary additional resources are utilized. Further, in most cases, it reduces or eliminates the dependency on a central server to "broker" the transaction, reducing the ability to manage security and information disclosure. This approach further eliminates the opportunity to customize the content to include elements such as advertising or other content customized to the recipient based on additional information such as known personal purchasing history, or

interests. The complexity also is increased because one of the main devices targeted by the present invention is the phone. In this case of performing peer to peer networking using Bluetooth in a phone significant resources including memory and application software processing would be required to support full IP protocol networking over such a connection. The support for IP based networking already is including for WWAN connections and as a result, communication between one device to another using the WWAN is currently supported in many devices with no modification. The use of simple detection of one or more identifiers requires significantly less resources in a phone than performing a complete peer to peer based communication network with dynamic configuration of nodes being added and dropped continuously.

Finally, Mesh networking requires that a mesh node act like a router after the reception. A node receives a packet in using a peer to peer protocol, then performs a routing function to facilitate the forwarding of packets to other wireless nodes, or to connected wired devices, then it transmits the packet with modified addressing information. In a mobile phone environment, such a topology has similar disadvantages to the case of a pure Peer to Peer topology. Using the broadcast identifiers for detection allows for no complex management of routs, or the addition and removal of addresses to other detected mobiles. It is noted that the IP address, or other user contact information allowing communication is NOT location dependent in the present invention, but IS location dependent when true Peer to Peer or Mesh topologies are used. The present invention has the advantage that communication between two devices may continue after the devices have left proximity of each other, but in the same manner as they had been conversing previously. As a result a user who detects a short range transmission of an identifier, then begins a conversation or some other interaction with that device via the wireless wide area network may continue that conversation even in the case where the two devices move out of the proximity of the each other, and are no longer within the reception range of the short range wireless communication protocol.

Additionally, since in the current invention, the server and the WWAN is involved with all mobile devices utilizing this approach, a coordination of the broadcasting periods and the searching periods for the short range radios is possible. This will allow for reduced

power consumption and other resource consumption in the devices. If no coordination is achieved, then the short range receivers in each device must be scanning of transmitted identifiers much more often and for longer durations. Utilizing the a common timing base, and the central server to notify the devices of a coordination approach for "active times" and "non-active times" will allow for the devices to minimize the power consumption they consume in the transmission of and scanning for identifiers. It will also allow for a synchronized approach for the update of each device's identifier, as described previously to enhance anonymity and security, coordinated with the central server. The "non-active times" may be used as "boundaries" over which the changing identifiers may be updated. This update may be based on either direct communication with the server, or rule and algorithm based updates previously coordinated with the central server so as to minimize server messaging, but allowing the updates to remain synchronized to the server such that the device and the server are always associating the same identifier between them. As will be recognized by an individual skilled in the area of information technology, the concept of a central server may well be implemented as a collection of servers to allow for load balancing, redundancy, and the like in a manor common to the information technology industry.

Requiring the brokering of the communication via a central server will also allow a mobile device to receive information associated with a "broadcast only" device, such as in the museum example discussed previously. This is important as broadcast devices can enable a vast set of new applications built upon the infrastructure developed in this application, beyond the museum like application. Some of these applications may involve an electronic commerce aspect.

Electronic Commerce Applications and Disclosure

E-commerce (e-proximity) between two mobile devices

An example is that of two individuals performing a transaction on the street, a customer and a street vendor. In this example, an individual would see a vendor and their device (enabled with the current invention) would notify them that the vendor was enabled with

a device supporting the current invention as well, and capable of electronic payments. The customer, having an account enabled with electronic payments, and wanting an item the vendor has, would walk up to the merchant and place their order. Additionally, the customer would press a button on the phone (or other device) which would indicate they would like to make a purchase and pay using their device. The customer's device would then send a message to the central server indicating the customer would like to make an electronic payment to the merchant detected by the device. In return, the server would send a picture of the merchant, their establishment, or other identifying information (even a commonly shared code in some cases) to the customer's device and ask them to confirm the identity of the merchant. In the case where the identifying information is a picture the user would look at the merchant, and press a button on the device if their picture was correct. As an alternative, the information may be a picture of the establishment, or the vendor's name for their establishment. In some cases, the identifying information might even be a password sent to the merchant, the merchant would need to provide this password to the customer to be confirmed by the server or by the user themselves, or visa versa. The picture approach is expected to be the most common approach.

Next, the server requests the list of identifiers the merchant's device has detected, and determines if one of those identifiers is associated with the customer, further confirming that the customer is near the merchant, and to reduce fraudulent activity.

Assuming the two way proximity detection, the server would send a request to the merchant's device indicating the desire for the electronic payment, and a picture of the customer associated with the account on the device. The merchant would conform, on their device, that they have identified the customer and would provide the price or the item (with the price previously inputted) to the device, which would relay this information to the server. Alternatively, a point of sale device like a cash register could be interfaced to the enabled device and receive the list of purchased items, to use for this step.

The server would them send a message to the customer's device. The customer would then conform they payment amount to be paid to the merchant, and that the inventory list is correct. The funds may likely be in a escrow like state at that point, in a manor similar to a Paypal payment or utilizing a stored credit card number, which could be reversed if the transaction were not consummated. The merchant would receive an indication from the server via their device that the payment has been made, and provide the purchased item to the customer. The merchant may optionally select an "item delivered" indication on their device, which would rely this information to the server over the internet connection. Upon charging of the customer's account by the server, the server would request a confirmation form the customer (via their device) that they have received their purchased goods or services. The customer would then select an indication they have received the purchased item(s) and the transaction would be complete. Further, if the customer does not deny the reception of the goods the funds may be paid regardless. Additionally, the server would keep track of the transactions and any negative feedback provided by any past participants in transactions for judging the character of each particular account holder. Further, the server involved in allowing the payment process between these two parties would have the capability to interface to third parties to determine if each of the parties were reputable in terms of being able to pay and consistently providing desired goods and services in an ethical way. Again, an example of such a third party would be PayPal or a credit card company, or other electronic service.

Finally, this transaction may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. This process would be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

Ecommerce between a fixed broadcast device and a mobile device

Football stadium application example

In another example of an embodiment of a transaction model, enabled by the infrastructure of the present invention, would be in an event such as a concert, or sporting event (particularly when it is an indoor venue where no GPS is available). A number of the broadcast only devices would be placed through out the seating areas. The devices would be very short range, and only transmit intermittently and as a result may be battery powered and would remain active a very long time period. Each device would be placed in a known location, in a predicable manor.

An attendee at the event would have a device enabled with the present invention. The device would detect a broadcast device, and interact over the internet with the server via the WWAN connection. The server would receive an indication of the broadcast device's identifier and the identifier of the account associated with the device which detected the broadcast device. The server would retrieve content associated with the service provider's account and provide that content to the application on the requesting mobile device that this venue has a product delivery service. The user may press an indication on their device that they would like to see a menu or list of items for sale from the merchant or merchants in the venue. The application on the user's device would then allow them to see a menu for instance and select items to purchase. The user then would be asked to confirm the purchase. The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. In this case, it is expected that a delivery fee would also be charged for the enhanced service. The server would facilitate the purchasing of the goods or services from the merchant and payment from customer's account, and provide confirmation to each. Such confirmation would include an electronic receipt provided to the customer, for user upon arrival of the delivery person of the good or service. The customer would then select an indication on their device confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition. Optionally, the delivery person of the good or service may have an enabled mobile device as well. In this case the identifiers

may be detected by the customer's device and reported to the server to confirm that the provider's delivery person was present. Further, the delivery person's device would be able to detect the broadcast devices identifier and reported to the server confirming the deliver person was in the correct area independently. Even further proximity confirmation may be achieved by the customer's device's transmitted identifier being detected by the delivery person's device and reported to the central server further confirming the physical proximity of the parties involved in the transaction. Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. These cross confirmations would allow for the central server evidence to justify payments both in completed transactions and in disputed or failed transactions. Further, the delivery person may receive a picture of the requesting customer. Once the customer is found, the delivery person would confirm the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server. The customer would have the option to report confirmation or denial of the reception of the product or service as well, as in the last example.

In another embodiment, the merchant device may be fixed, but have an internet connection (wireless or otherwise). Further, in some embodiments the merchant may be an automated device such as a vending machine. In such a model, a customer may use their enabled cell phone to purchase an item such as a beverage from the machine without the need to insert currency into the machine. This would be accomplished by the customer's cell phone detecting the vending machine transmission of the identifier or visa-versa. Following the detection of either the customer's identifier by the vending machine, or the customer detecting the vending machine identifier, the respective device would notify the server, who intern would provide notification (assuming the account settings allow for notification) to the potential customer via their device. Assuming the customer selects to purchase an item from the vending machine using their account associated with their device, the customer may be presented a menu as in the example above. The customer may further be presented information to ensure the identity of the vending machine, such as a description of the machine, a machine identification number,

or a (most likely) a picture of the machine where it is located. The customer would confirm this is the machine they are interfacing with, and select to pay via their account. The customer may in one model select the item to dispense on their phone, or they may simply select to provide payment to the machine allowing them to make the selection manually as is the typical mode of operation today. The vending machine would interact with the server via it's internet connection, and participate in the transaction in a manor similar to the mode described above allowing for step by step conformations as previously described.

Electronic opinion polling, tied to a known location.

In a much simpler example, such a capability might be used to tie a survey to a known location in such a way as to provide an e-coupon to the survey taker on their device in return for completion of the survey. Alternatively, this type of interaction would enable a very large crowd to interact with a Jumbo-Tron like display to provide input to polls or to participate in group activities. Users at different locations in a audience may form teams and interact with other teams for group activities.

Key Concepts to protect:

Top level Key Concepts:

- One device transmitting a wireless identifier using a wireless protocol capable of peer to peer communication
- The wireless identifier being associated with a specific account on a server connected to the internet
- A second device receiving the wireless identifier
- The second device capable of communicating with the server over an internet connection
- The second device requesting information from the service associated with the first identifier
    - The second device having a second identifier associated with a second account on the server
    - The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts
- The identifiers associated with the accounts being updated such that the identifiers would no longer recognized as being associated with specific accounts without past or current interaction with the server
- Using one or more of Cellular network timing information, and information form the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption)

More Detailed Key Concepts to protect

1) A device capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and the second wireless protocol to communicate with a remote server, where:

    a. One or more of the devices are mobile devices
    b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol
    c. Where the first wireless capability is re-purposed using a modified or enhanced protocol for
        i. Advertising the presence of the devices or,
        ii. Detecting the presence of another device
    d. Where the method of detecting or advertising the presence of another device utilizing the modified protocol involves embedding or detecting messaging in the standard based broadcasts from the standards based wireless modem, where the standards based protocol is based on, related to, or otherwise derived from IEEE802.11, Bluetooth
    e. Utilizing a wireless wide area data link from one or more of the wireless devices to:
        i. Connect to a central server
        ii. Perform user authorization functions
        iii. Perform download of information associated with account identifiers utilizing the short range wireless capability
        iv. Request forwarding of messages / packets to the other active account
    f. Utilizing the messaging with a mobile proximity based social networking capability
        i. The messaging being performed via the WWAN

g. The server providing a centrally assigned user identity, with relationship brokering or identification capability

h.

2) A central serving capability to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server

- where the information passed to the central server is collected by one wireless device from another wireless device via a separate local wireless reception from the other wireless device
- where the separate local wireless reception from the second wireless device contains information directly assigned by, derived from, or known to the central server associated with the identity of the second wireless device.
- Where this identity is related to certain information and preferences of an account holder associated with an application operating on the second wireless device
- Where this application is operating on both wireless devices
- Where the application operating on the first device also provides it's own identifying information to the central server as well as detected identifiers from devices with applications on them.
- The central server containing the account information registered to the applications running on each wireless device
- Where the preferences associated with the account information also contains policies related to the disclosure of one account's stored information to other accounts and hence to their application on their devises
- These policies including a classification of other accounts each classification having different policies some of these policies being:
  - no not allow notification of my presence
  - allow notification of my presence

- disclose my name/ do not disclose my name
- disclose age / do not disclose age
- disclose personal details
- allow interaction such as
    - chat
    - file exchange
    - photo push
    - Voip
    - Voip push
    - Invitations to engage in shared applications such as games
        - Games may be networked trivia games and the like
        - Using other resources on the device such as an accelerometer to play active games link ping pong or other multi player games using either the WWAN or more desirably the local wireless link to perform the inter-device interaction.
- Performing anonymous interaction
- Where an application running on each device performs point of sale transitions coordinated via the central server, over the WWAN, utilizing user input on each device as confirmation of successive steps in the transition.
    - Further, where at least one of the confirmation steps additionally involves displaying an identifying picture related to one of the devices, on the other device
    - Additionally the server performing an authorization for the transition to a third party
    - Additionally, the server providing a participant confidence indication to one of the participant in the transaction to the other participant in the transaction
        - Where the participant confidence indication is related to past transactions for the participant

- Where the participant confidence is related to ratings by other past participants of the current participant
- A device interacting with a point of sale device to associate an itemized list of items with a detected second device
- The service performing a confirmation with the application on the second device requiring user input that the inventory list is correct
- The server storing the information related to the second devices detected account identity and inventory in a database for later use

3) A device in the present invention with a wireless capability with no WWAN capability, but only with the ability to broadcast a unique identifier.

- The server having the broadcasts device's details. And when the first device provides these detail to the server, authorized and current information about the broadcast device are provided to the first wireless device.
- Where this information includes advertising information or information related to "e-coupons" for special offers for products or services
  - Where the content of the e-coupons are customized based on the identity of the requesting device or account holder
    - Where the content is further customized based on other information known by the server related to the user's account
    - Where the other information is related to the user's past purchasing practices or previous requests
- A mobile device, upon detecting a broadcast device and if enabled to do so, will report that broadcast Id to the server over a WWAN, and retrieve the current content from the server associated with that device and:
  - Display it to the user on their device

        - Execute instructions associated with the information retrieved from the server.
    - Pre-authorizing difference classes of broadcast devices such that different levels of authentication are required
    - One of the levels of authentication being no authentication

4) A good or service delivery model utilizing the above described broadcast device, placed in a known location,
    a. The mobile device detecting the fixed device's identifier via the WPAM/WLAN
    b. The mobile device reporting this identifier and passing an identifier associated with itself, or the account associated with the user utilizing the device.
    c. The server determining that the detected broadcast device is associated with the broadcast device with a known location
    d. The server further determining that the identifier is associated with a service, and further associated with an account or that service
    e. The server retrieving content associated with the service provider's account and providing that content to the application on the requesting mobile device.
    f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items. This could be implemented in java code, xml, simple text, or other for example optionally including active code elements.
    g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items.

h. A user providing selection of one or more of the items, and confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device
i. The server facilitating the purchasing of the goods or services from the merchant's account and the customer's account, and providing confirmation to each. Such confirmation including an electronic receipt provided to the customer, for user upon arrival of the deliverer of the good to or service.
j. The customer confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition
k. The deliverer of the good or service optionally having a mobile device supporting the current invention,
    i. such that identifiers from that device may be detected by the customers device and reported to the server to confirm that the provider's delivery person was present
    ii. such that the broadcast devices identifier is detected by the delivery person's mobile device and reported to the server confirming the deliver person was in the correct area
    iii. such that the customer's device's transmitted identifier is detected by the delivery persons device and reported to the central server further confirming the physical proximity of the parties involved in the transaction
    iv. The delivery person confirming the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server.

5) Generating an application to operate at the application layer, which interfaces to a standard driver interface or using a proprietary modified driver on a device

- Using wi-fi 802.11 to perform the WLAN operation, but in a modified protocol.
- Where that device is a 802.11 device
- Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device
- Where the interface is an NDIS driver or the like
- Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server
- Using 1xEVDO, HSDPA, GPRS, EDGE or the like for the WWAN interface.
- An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identifier (know to the central server), and report back all other broadcasted identifiers from other devices.
- The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers.
    - The decision process may be based on priority of the identifier, the class an identifier belongs to, a list the identifier is, or is not including on, other functions currently being performed on the device such as:
        - Music being played
        - Video being played
        - A phone conversation currently being engaged in
        - The time of day
    - Based on the result of the action function, sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information

back from the server related to that identifiers' account information stored on that server.

- The server receiving a request from a device's application, with a detected identifier
    - The server examining both the requesting and the requested identifier's identity and making a policy decision regarding the release of the requested identifiers information related to their account
    - The decision may be:
        - Implicit: always provide the information
        - Explicit: only provide the information to a specific list of other identifiers
        - Limited: only specific information may be released to specific accounts, or classes of accounts
    - The server in some cases providing a continuously or periodically changing account or device identifier to a specific application on a device to enhance the privacy of the identity of that device
        - The changing of the identifier may be effected by a rule based generation local to the application, or may be downloaded from the server directly
        - The update of the identifier being synchronized to such that it is coordinated with predetermined scanning and broadcasting periods allowing for a known update boundary.
- The information provided from the server to the application resident on the device may include:
    - The identity of the user with the specified account identifier
    - Applications that user / device is able to use
    - Capabilities of that user / device

- Actual applications which are shared with other users, for use with that user in a joint manor

6) Using the mobile device's time of day derived from the network or other reference synchronize the PAN/WLAN discovery and advertisement times to save battery life. Doing this in a synchronized way among multiple devices. Coordinating the timing information utilizing the WWAN and a central server available commonly to the devices.

    - Synchronize the heartbeats and or ping / echo timing to save power from WWAN network parameters obtained for the server
    - Coordinating any identifier updates to this same timing source

Business Processes to protect:

- Using the above described application to push content to the user's device.
- Providing paid advertising content to a mobile device based on a request from that device for the information associated with a detected identifier, which is associated with a broadcast device.

EXHIBIT C Claim 1 feature	Context in U.S. Patent Application 12/364,828 filed February 3, 2009	Citation to the text of the '828 Application
determining that at least one beacon transmitter device associated the proximity beacon service is in proximity to the wireless device by utilizing the identifier related information	a wireless device receives beacon transmissions from another wireless device (Fig. 6 items 604, 605, 606) the beacons (e.g., IBSS beacons) and the beacon transmissions include identifiers (e.g., a BSSID or SSID) the identifiers indicate which beacons are associated with a service the identifier related information is then used to determine which devices (or related entities or objects) are in proximity (Fig. 7 step 706 and 707)	"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 10-12) "These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)" (p.12-14); "...one or more of the BSSID and the SSID may be used as the identifier." (p.17,l.21-22) "..one or both the BSSID and the SSID may be used to indicate those particular beacons are associated with a service" (p. 17, l 20-21) "Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present .... The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707." (p.18, l.18-26)
identifier related information associated with a proximity beacon service is received from a server using a first radio,	a device identifier is detected by a wireless device (Fig. 7, step 704); and the detected identifier is sent to the server (Fig. 7, step 705); the server then responds (Fig. 7, step 706) with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Fig. 1, the WWAN link 103)	"The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1×EV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). ... "The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18, l.9-26) "a given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100" (p.11, l.10-12)
the proximity beacon transmissions are received using a second radio,	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from the other nearby wireless devices using a second radio the beacons are received via the second radio (e.g., the short range wireless connection 107)	"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 6-12) "a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108" (p.11, l.6-8)
the proximity beacon information is derived from the proximity beacon transmissions, and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include an associated identifier (step 704))	"..one or more of the BSSID and the SSID may be used as the identifier. (p.17, l.18-22). "delivery of the identifier in an IBSS beacon..." (p.17, l.22-23)
a proximity of a device associated with the proximity beacon service is determined by the mobile device using the identifier related information	"identifier related informaton" is the information returned from the server in step 706. That information is then used as part of a further determination that another device associated with the beacon service is in proximity (e.g., step 707 where a user application notifies the user that an entity (a particular person) associated with device 2 is in proximity)	The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18,l 21-23) A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. (p.18,l24-26)

Exhibit D Claim 1 feature	Context in U.S. Provisonal Patent Application 61/095,359 filed September 9, 2008	Citation to the supporting text of the '359 Application
determining that at least one beacon transmitter device associated the proximity beacon service is in proximity to the wireless device by utilizing the identifier related information	wireless device receives beacon transmissions the beacons include identifiers (e.g., an SSID) the identifiers are used to determine which devices (or related entities such as other users) are in proximity	As an example of the overall process, a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for theindividuals within the friends list have been passed to the device, the action function may make this determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function would work to reduce frequency of requests to the server.(p. 3 last par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with infomation which the users associated with the identifiers are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows r disclose of a user's presence only to individuals on this lis (p.4 third par.)
identifier related information associated with a proximity beacon service is received from a server using a first radio,	a device identifier is detected by a wireless device; and the detected identifier is sent to the server the server then responds with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Figure 1, the WWAN link)	When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identifiers and request that the server provide the device with the information related to any identifier that is 1) relevant to that device, and 2) that device is authorized to receive. (p. 3, second par.) As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies. In this way, the central server controls the process of passing information related to an account to a particular requesting device. (p. 4, last two lines, and p. 5, first two lines)
the proximity beacon transmissions are received using a second radio,	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from other nearby wireless devices using a second radio the beacons are received via the second radio (Figure 1, the Bluetooth connection)	Title 2: Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection (p. 1 l. 11-12) Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device Where the interface is an NDIS driver or the like, Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of associated account identifier gistered to the central server (p.22, l.3-9) An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identier (know to the central server), and report back all other broadcasted identifiers om other devices. The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers. (p. 22 l. 12-16) ... the short range wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices. (p.2 last par.)
the proximity beacon information is derived from the proximity beacon transmissions, and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include information related to an associated identifier)	Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server (p.22 l. 7-9)
a proximity of a device associated with the proximity beacon service is determined by the mobile device using the identifier related information	"identifier related informaton" is the information returned from the server. That information is then used as part of a further determination that another device is in proximity (e.g., where a mobile application called an "action function" is given a friends list)	a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. (p. 3, las par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information which the users associated with the identifirrs are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows to disclose of a user's presence only to individuals on this list.(p. 4, third par.)

EXHIBIT E Claim 31 feature	Context in U.S. Patent Application 12/364,828 filed February 3, 2009	Citation to the text of the '828 Application
communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;	the wireless device communicates with a server via a first radio (Fig. 1, the WWAN link 103) "detected identifiers are sent to the server (Fig. 7, step 705); the server then responds with "identifier related informaton" (Fig. 7 step 706).	a given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100 (p.11, l.10-12) The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1×EV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). ... "The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18, l.9-26)
receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from the other nearby wireless devices using a second radio (e.g., Fig. 1, the short range wireless connection 107)	"a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108" (p.11, l.6-8) "In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 10-12) a wireless device receives beacon transmissions from other wireless devices (Fig. 6 items 604, 605, 606)
deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions; and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include an associated identifier (step 704))	"..one or more of the BSSID and the SSID may be used as the identifier. (p.17, l.18-22). "delivery of the identifier in an IBSS beacon..." (p.17, l.22-23)
determining, at the mobile device, that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile device by utilizing the identifier related information;	the identifiers are then used to determine which devices (or related entities or objects) in proximity are have relevance (Fig. 7 step 706 and 707) That information returned from the server then further processed by the mobile device (e.g., step 707 where a user application notifies the user that an entity associated with device 2 is in proximity)	"The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. (p.18, l.18-26)
wherein each of the proximity beacon transmissions comprises a MACaddress, a unique identifier, and proximity beacon service identifier;	The beacons contain a MAC address, unique identifier, and proximity beacon information	"These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)" (p.12-14); "...one or more of the BSSID and the SSID may be used as the identifier." (p.17,l.21-22)
wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service	the beacons (e.g., IBSS beacons) and the beacon transmissions include identifiers (e.g., a BSSID or SSID) the identifiers may be the same for different devices participating in the same particular service	..one or both the BSSID and the SSID may be used to indicate those particular beacons are associated with a service (p. 17, l 20-21) In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID" (p.17 l.25-27)

EXHIBIT F Claim 31 feature	Context in U.S. Patent Application 61/095,359 filed September 9, 2008	Citation to the text of the '359 Application
communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;	a device identifier is detected by a wireless device; and the detected identifier is sent to the server the server then responds with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Figure 1, the WWAN link)	When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identi ers and request that the server provide the device with the information related to any identifier that is 1) levant to that device, and 2) that device is authorized to receive. (p. 3, second par.) As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies. In this way, the central server controls the process of passing information related to an account to a particular requesting device. (p. 4, last two lines, and p. 5, first two lines)
receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from other nearby wireless devices using a second radio the beacons are received via the second radio (Figure 1, the Bluetooth connection)	Title 2: Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection (p. 1 l. 11-12) Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device Where the interface is an NDIS driver or the like, Using the fields in the NDIS driver in a non standard way such as using the SSID of the beacons to broadcast, or advertize the presence of associated account identifier gistered to the central server (p.22, l.3-9) An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identier (know to the central server), and report back all other broadcasted identifiers from other devices. The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers. (p. 22 l. 12-16) ... the shorange wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices. (p.2 last par.)
deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions; and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include information related to an associated identifier)	Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server (p.22 l. 7-9)
determining, at the mobile device, that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile device by utilizing the identifier related information;	"identifier related informaton" is the information returned from the server. That information is then used as part of a further determination that another device is in proximity (e.g., where a mobile application called an "action function" is given a friends list)	a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. (p. 3, last par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information which the users associated with the identifirrs are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows to disclose of a user's presence only to individuals on this list.(p. 4, third par.)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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MEMORANDUM

DATE: April 19, 2018

TO: Patent Examining Corps

FROM: Robert W. Bahr
Deputy Commissioner
for Patent Examination Policy

SUBJECT: Changes in Examination Procedure Pertaining to Subject Matter Eligibility, Recent Subject Matter Eligibility Decision (*Berkheimer v. HP, Inc.*)

The USPTO recognizes that unless careful consideration is given to the particular contours of subject matter eligibility (35 U.S.C. § 101), it could "swallow all of patent law." *Alice Corp. v. CLS Bank International*, 573 U.S. ___, ___, 134 S. Ct. 2347, 2352 (2014) (citing *Mayo Collaborative Servs.* v. *Prometheus Labs., Inc.*, 566 U.S. 66, 71, 132 S. Ct. 1289, 1293-1294 (2012)). This memorandum provides additional USPTO guidance that will further clarify how the USPTO is determining subject matter eligibility in accordance with prevailing jurisprudence. Specifically, this memorandum addresses the limited question of whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity. The USPTO is determined to continue its mission to provide clear and predictable patent rights in accordance with this rapidly evolving area of the law, and to that end, may issue further guidance in the future.

The U. S. Court of Appeals for the Federal Circuit (Federal Circuit) recently issued a precedential decision holding that the question of whether certain claim limitations represent well-understood, routine, conventional activity raised a disputed factual issue, which precluded summary judgment that all of the claims at issue were not patent eligible. *See Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018). Shortly thereafter, the Federal Circuit reaffirmed the *Berkheimer* standard in the context of a judgment on the pleadings and judgment as a matter of law.[1] While summary judgment, judgment on the pleadings, and judgment as a matter of law

[1] In *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121 (Fed. Cir. 2018), the Federal Circuit reversed a judgment on the pleadings of ineligibility, similarly finding that whether the claims in the challenged patent perform well-understood, routine, conventional activities is an issue of fact. In *Exergen Corp. v. Kaz USA, Inc.*, Nos. 2016-2315, 2016-2341, 2018 WL 1193529, at *1 (Fed. Cir. Mar. 8, 2018) (non-precedential), the Federal Circuit affirmed a district court's denial of a motion for judgment as a matter of law of patent ineligibility (thus

standards in civil litigation are generally inapplicable during the patent examination process, *Berkheimer* informs the inquiry into whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity.

I. Federal Circuit Decision in Berkheimer: In *Berkheimer*, the invention relates to digitally processing and archiving files in a digital asset management system. The patent specification explains that the system eliminates redundant storage of common text and graphical elements, which improves system operation efficiency and reduces storage costs. With respect to *Mayo/Alice* step 1 (step 2A in the USPTO's guidance), the Federal Circuit held that the claims are directed to the abstract ideas of parsing and comparing data (claims 1-3 and 9), parsing, comparing, and storing data (claim 4), and parsing, comparing, storing, and editing data (claims 5-7) based upon a comparison of these claims to claims held to be abstract in prior Federal Circuit decisions. *Berkheimer*, 881 F.3d at 1366-67. With respect to *Mayo/Alice* step 2 (step 2B in the USPTO's guidance), the Federal Circuit considered the elements of each claim both individually and as an ordered combination, recognizing that "whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact." *Id.* at 1367-68. While observing that the specification discussed purported improvements (*e.g.*, reducing redundancy and enabling one-to-many editing as the purported improvements), the Federal Circuit held claims 1-3 and 9 ineligible because they do not include limitations that realize these purported improvements. *Id.* at 1369-70.

In contrast, the Federal Circuit held that claims 4-7 do contain limitations directed to purported improvements described in the specification (*e.g.*, claim 4 recites "storing a reconciled object structure in the archive without substantial redundancy," which the specification explains improves system operating efficiency and reduces storage costs), raising a genuine issue of material fact as to whether the purported improvements were more than well-understood, routine, conventional activity previously known in the industry. *Id.* at 1370. The Federal Circuit therefore reversed the district court's decision on summary judgment that claims 4-7 are patent ineligible, and remanded for further fact finding as to the eligibility of those claims. *Id.* at 1370-71.

Finally, the Federal Circuit drew a distinction between what is well-understood, routine, conventional, and what is simply known in the prior art, cautioning that the mere fact that something is disclosed in a piece of prior art does not mean it was a well-understood, routine, conventional activity or element. *Id.* at 1369.

II. Well-Understood, Routine, Conventional Activity: While the *Berkheimer* decision does not change the basic subject matter eligibility framework as set forth in MPEP § 2106, it does provide clarification as to the inquiry into whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity. Specifically, the Federal Circuit held that "[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination." *Id.* at 1369.

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upholding the district court's conclusion that the claims were drawn to a patent eligible invention), concluding that the district court's fact finding that the claimed combination was not proven to be well-understood, routine, conventional was not clearly erroneous.

As set forth in MPEP § 2106.05(d)(I), an examiner should conclude that an element (or combination of elements) represents well-understood, routine, conventional activity **only** when the examiner can readily conclude that the element(s) is widely prevalent or in common use in the relevant industry. This memorandum clarifies that such a conclusion must be based upon a factual determination that is supported as discussed in section III below. This memorandum further clarifies that the analysis as to whether an element (or combination of elements) is widely prevalent or in common use is the same as the analysis under 35 U.S.C. § 112(a) as to whether an element is so well-known that it need not be described in detail in the patent specification.[2]

The question of whether additional elements represent well-understood, routine, conventional activity is distinct from patentability over the prior art under 35 U.S.C. §§ 102 and 103. This is because a showing that additional elements are obvious under 35 U.S.C. § 103, or even that they lack novelty under 35 U.S.C. § 102, is not by itself sufficient to establish that the additional elements are well-understood, routine, conventional activities or elements to those in the relevant field. *See* MPEP § 2106.05. As the Federal Circuit explained: "[w]hether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art. The mere fact that something is disclosed in a piece of prior art, for example, does not mean it was well-understood, routine, and conventional." *Berkheimer*, 881 F.3d at 1369.

III. Impact on Examination Procedure: This memorandum revises the procedures set forth in MPEP § 2106.07(a) (Formulating a Rejection For Lack of Subject Matter Eligibility) and MPEP § 2106.07(b) (Evaluating Applicant's Response).

A. Formulating Rejections: In a step 2B analysis, an additional element (or combination of elements) is not well-understood, routine or conventional unless the examiner finds, and expressly supports a rejection in writing with, one or more of the following:

1. A citation to an express statement in the specification or to a statement made by an applicant during prosecution that demonstrates the well-understood, routine, conventional nature of the additional element(s). A specification demonstrates the well-understood, routine, conventional nature of additional elements when it describes the additional elements as well-understood or routine or conventional (or an equivalent term), as a commercially available product, or in a manner that indicates that the additional elements are sufficiently well-known that the specification does not need to describe the particulars of such additional elements to satisfy 35 U.S.C. § 112(a). A finding that an element is

[2] *See Genetic Techs. Ltd. v. Merial LLC*, 818 F.3d 1369, 1377 (Fed. Cir. 2016) (supporting the position that amplification was well-understood, routine, conventional for purposes of subject matter eligibility by observing that the patentee expressly argued during prosecution of the application that amplification was a technique readily practiced by those skilled in the art to overcome the rejection of the claim under 35 U.S.C. 112, first paragraph); *see also Lindemann Maschinenfabrik GMBH v. Am. Hoist & Derrick Co.*, 730 F.2d 1452, 1463 (Fed. Cir. 1984) ("[T]he specification need not disclose what is well known in the art."); *In re Myers*, 410 F.2d 420, 424 (CCPA 1969) ("A specification is directed to those skilled in the art and need not teach or point out in detail that which is well-known in the art."); *Exergen Corp.*, 2018 WL 1193529, at *4 (holding that "[l]ike indefiniteness, enablement, or obviousness, whether a claim is directed to patent eligible subject matter is a question of law based on underlying facts," and noting that the Supreme Court has recognized that "the inquiry 'might sometimes overlap' with other fact-intensive inquiries like novelty under 35 U.S.C. § 102").

well-understood, routine, or conventional cannot be based only on the fact that the specification is silent with respect to describing such element.

2. A citation to one or more of the court decisions discussed in MPEP § 2106.05(d)(II) as noting the well-understood, routine, conventional nature of the additional element(s).

3. A citation to a publication that demonstrates the well-understood, routine, conventional nature of the additional element(s). An appropriate publication could include a book, manual, review article, or other source that describes the state of the art and discusses what is well-known and in common use in the relevant industry. It does not include all items that might otherwise qualify as a "printed publication" as used in 35 U.S.C. § 102.[3] Whether something is disclosed in a document that is considered a "printed publication" under 35 U.S.C § 102 is a distinct inquiry from whether something is well-known, routine, conventional activity. A document may be a printed publication but still fail to establish that something it describes is well-understood, routine, conventional activity. *See Exergen Corp.*, 2018 WL 1193529, at *4 (the single copy of a thesis written in German and located in a German university library considered to be a "printed publication" in *Hall* "would not suffice to establish that something is 'well-understood, routine, and conventional activity previously engaged in by scientists who work in the field'"). The nature of the publication and the description of the additional elements in the publication would need to demonstrate that the additional elements are widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a). For example, while U.S. patents and published applications are publications, merely finding the additional element in a single patent or published application would not be sufficient to demonstrate that the additional element is well-understood, routine, conventional, unless the patent or published application demonstrates that the additional element are widely prevalent or in common use in the relevant field.

4. A statement that the examiner is taking official notice of the well-understood, routine, conventional nature of the additional element(s). This option should be used **only** when the examiner is certain, based upon his or her personal knowledge, that the additional element(s) represents well-understood, routine, conventional activity engaged in by those in the relevant art, in that the additional elements are widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a). Procedures for taking official notice and addressing an applicant's challenge to official notice are discussed in MPEP § 2144.03.

B. Evaluating Applicant's Response: If an applicant challenges the examiner's position that the additional element(s) is well-understood, routine, conventional activity, the examiner should reevaluate whether it is readily apparent that the additional elements are in actuality well-

[3] *See, e.g., In re Klopfenstein*, 380 F.3d 1345 (Fed. Cir. 2004) (publicly displayed slide presentation); *In re Hall*, 781 F.2d 897 (Fed. Cir. 1986) (doctoral thesis shelved in a library); *Mass. Inst. of Tech. v. AB Fortia*, 774 F.2d 1104, 1108-09 (Fed. Cir. 1985) (paper orally presented at a scientific meeting and distributed upon request); *In re Wyer*, 655 F.2d 221 (CCPA 1981) (patent application laid open to public inspection).

understood, routine, conventional activities to those who work in the relevant field. If the examiner has taken official notice per paragraph (4) of section (III)(A) above that an element(s) is well-understood, routine, conventional activity, and the applicant challenges the examiner's position, specifically stating that such element(s) is not well-understood, routine, conventional activity, the examiner must then provide one of the items discussed in paragraphs (1) through (3) of section (III)(A) above, or an affidavit or declaration under 37 CFR 1.104(d)(2) setting forth specific factual statements and explanation to support his or her position. As discussed previously, to represent well-understood, routine, conventional activity, the additional elements must be widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a).

The MPEP will be updated in due course to incorporate the changes put into effect by this memorandum.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **07/20/2018**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $50 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $230 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
LORRAINE E. WALDEN

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7	7653

86012 7590 09/07/2018

VLP Law Group LLP
555 Bryant Street
Suite 820
Palo Alto, CA 94301

EXAMINER
SHERR, MARIA CRISTI OWEN

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
09/07/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@vlplawgroup.com

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Doc Code:
TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.: 15/271,410

1. THE REQUEST FILED July 20, 2018 IS **GRANTED.**

The above-identified application has met the requirements for prioritized examination

A. ☐ for an original nonprovisional application (Track I).
B. ☒ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;

C. filing a **request for continued examination**;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Cheryl Gibson-Baylor at (571)272-3213, Office of Petitions. In his/her absence, calls may be directed to Brian W. Brown, (571)272-5338.

Cheryl Gibson-Baylor
/Cheryl Gibson-Baylor/
[*Signature*]

Petitions Paralegal Specialist
(Title)

Office of Petitions: Routing Sheet



Application No. 15271410

This application is being forwarded to your office for further processing. A decision has been rendered on a petition filed in this application, as indicated below. For details of this decision, please see the document PET.OP.DEC filed on the same date as this document.

- [X] **GRANTED**
- [ ] **DISMISSED**
- [ ] **DENIED**

Office of Petitions: Decision Count Sheet

9

Application No. 15271410



For US serial numbers: enter number only, no slashes or commas. Ex: 10123456

For PCT: enter "51+single digit of year of filing+last 5 numbers", Ex. for PCT/US05/12345, enter 51512345

Deciding Official: GIBSON-BAYLOR, C

Count (1) - Palm Credit 15271410

Decision: GRANT

FINANCE WORK NEEDED

☐ Select Check Box for YES



Decision Type: 643 - Track One request



Notes:

Count (2)

Decision: n/a

FINANCE WORK NEEDED

☐ Select Check Box for YES

Decision Type: NONE

Notes:

Count (3)

Decision: n/a

FINANCE WORK NEEDED

☐ Select Check Box for YES

Decision Type: NONE

Notes:

Initials of Approving Official (if required)

Printed on: 9/4/2018

Office of Petitions Internal Document - Ver. 5.0

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPLICANT SUMMARY OF INTERVIEW WITH EXAMINER

On November 5, 2018 the Applicant's undersigned attorney contacted Examiner Sherr by telephone to confirm that this application has been granted Track I Prioritized Examination status, and to inquire when a first action might be forthcoming.

Examiner Sherr stated that an action could be expected within approximately the next 7 to 10 days.

Respectfully submitted,
/David J. Thibodeau Jr. Reg No 31671/
David J. Thibodeau, Jr. Reg. No. 31,671
VLP LAW GROUP LLP
Telephone: (617) 925-5520
Facsimile: (617) 925-5530

November 7, 2018

Electronic Acknowledgement Receipt

EFS ID:	34233326
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	07-NOV-2018
Filing Date:	21-SEP-2016
Time Stamp:	09:53:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	20181107_111054-0001U4C7_TPO_Interview_Summary.pdf	89836 d6b155342dac34ad5998ae5258fd7aa52b3e2873	no	1

Warnings:

Information:	
Total Files Size (in bytes):	89836

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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86012 7590 11/19/2018

VLP Law Group LLP
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EXAMINER
SHERR, MARIA CRISTI OWEN

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
11/19/2018	ELECTRONIC

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@vlplawgroup.com

Office Action Summary	Application No. 15/271,410	Applicant(s) Proctor et al.	
	Examiner CRISTINA O SHERR	Art Unit 3685	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 20 July 2018.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-2,4-10,12-15,17-19,21-23,31-32 and 34-42 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,4-10,12-15,17-19,21-23,31-32 and 34-42 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date July 20, 2018.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED CORRESPONDENCE

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

2. This Office Action is in response to the Applicant's Amendment filed July 20, 2018. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are pending in this case. Claims 24-30 were previously canceled. Claims 3, 11, 16, 20, and 33 are currently canceled. Claims 38-41 are newly added. Claims 14, 5, 7, 8, 9, 10, 13, 15, 17, 19, 23, 31, and 37 are currently amended.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 20, 2018, has been entered.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on July 20, 2018, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Remarks

5. Nonfunctional descriptive material does not serve to distinguish from the prior art. *In re Kao*, 639 F.3d1057, ___, 98 USPQ2d 1799, 1811-12 (Fed. Cir. 2011); *King Pharmaceuticals Inc. v. Eon Labs Inc.*, 616 F.3d1267, ___, 95 USPQ2d 1833, 1842 (Fed. Cir. 2010); *In re Gulack*, 217 USPQ 401 (Fed. Cir. 1983), *In re Ngai*, 70 USPQ2d (Fed. Cir. 2004), *In re Lowry*, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP 2111.05.

6. In claim 1, "each of the proximity beacon service transmissions including a MAC address, a unique identifier, and a proximity beacon service identifier" and "the proximity beacon service identifier indicating the proximity beacon transmissions are associated with the proximity beacon service, and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service" are nonfunctional descriptive material.

7. Similarly, in claim 31, "wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier, wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and wherein the proximity beacon service identifier is the same for al two or more proximity beacon transmissions associated with the proximity beacon service" is also nonfunctional.

Response to Arguments

8. Applicant's arguments, see **REMARKS**, filed July 20, 2018, with respect to the priority date of the claims, as currently amended, have been fully considered and are persuasive. The priority date of the claims, as currently amended, has been set at January 28, 2009.

9. Applicant's further arguments filed July 20, 2018, have been fully considered but they are not persuasive.

10. Applicant argues, regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42, as currently amended, that the claims recite statutory subject matter.

11. Examiner respectfully disagrees.

12. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

13. Applicant argues, regarding claim 4, as currently amended, that the claim complies with the written description requirement.

14. Examiner respectfully disagrees.

15. Claim 4 recites "occasionally change for security reasons", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

16. Applicant argues, regarding claim 18, as currently amended, that the claim complies with the written description requirement.

17. Examiner respectfully disagrees.

18. Claim 18 recites "is changed as well as to prevent . . .", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

19. Applicant argues, regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42, as currently amended, that the claims are neither vague nor unclear.

20. Examiner respectfully disagrees.

21. The claims recite multiple instances of apparatus and method steps of using the apparatus –

- Claim 2 --- "a randomly generated" (*Katz, UltimatePointer*).
- Claim 4 --- "occasionally change".
- Claim 5 --- "… change from time to time", "… making… anonymous over time…".
- Claim 6 --- "which is used…".
- Claim 15 --- "wherein . . . the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"

- Claim 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"
- Claim 18 --- "… and is generated algorithmically and only known to at least one of the servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"
- Claim 23 --- "wherein no connection is made between the mobile wireless device …"

22. Applicant's further arguments with respect to the claims, as currently amended, have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Claim Rejections - 35 USC § 101

23. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

24. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

25. Regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 –

26. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

27. The claims are directed to the abstract idea of determining distance.

<u>Subject Matter Eligibility Standard</u>

28. When considering subject matter eligibility under 35 U.S.C. 101, it must be determined whether the claim is directed to one of the four statutory categories of invention, i.e., process, machine, manufacture, or composition of matter. If the claim does fall within one of the statutory categories, it

must then be determined whether the claim is directed to a judicial exception (*i.e.*, law of nature, natural phenomenon, and abstract idea), and if so, it must additionally be determined whether the claim is a patent-eligible application of the exception. If an abstract idea is present in the claim, any element or combination of elements in the claim must be sufficient to ensure that the claim amounts to significantly more than the abstract idea itself. Examples of abstract ideas include fundamental economic practices; certain methods of organizing human activities; an idea itself; and mathematical relationships/formulas. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014).

Analysis

29. In this case, claim 31 recites a method.

30. Additionally, the claim is directed to the abstract idea of determining whether a device is in proximity to an access point. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014) The claim involves an algorithm that involves receiving a list of identifiers or locations, determining the location of a device, and determining that the device is in proximity to one of the locations on the list. The transaction device in this claim merely automates this algorithm, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself.

31. Regarding the additional element recited in the claim, such as the mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices, we note that these elements, in combination, only serve to use a computer or mobile device as a tool to automate and/or implement the abstract idea. Merely applying instructions by reciting the computing structure as a tool to implement the claimed limitations (see MPEP 2106.05(f)) or merely

linking the use of the judicial exception to a particular technological environment or field of use (MPEP § 2106.05(h)), does not serve to provide significantly more than the abstract idea. The claims do not, for example, purport to improve the functioning of the computer itself. Nor do they effect an improvement in any other technology or technical field. Instead, the claims at issue amount to nothing significantly more than an instruction to apply the abstract idea of determining the proximity of a device using a computer. "Under our precedents, that is not 'enough' to transform an abstract idea into a patent--eligible invention." See *Alice Corp. Pty. Ltd.*, 134 S.Ct. at 2360.

Conclusion

32. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

33. Accordingly, the Examiner concludes that there are no meaningful limitations in the claims that transform the judicial exception into a patent eligible application such that the claims amount to significantly more than the judicial exception itself.

34. The dependent claims 32, 34-37, and 40--42 do not resolve the deficiency of independent claims and accordingly stand rejected under 35 USC 101 based on the same rationale.

35. Independent claim 1 and its dependent claims 2, 4-10, 12- 15, 17-19, 21-23, and 38-41 merely implement the abstract idea of claim 31.

Claim Rejections - 35 USC § 112

36. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

37. The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

38. Claims 4 and 18 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

39. Regarding claim 4 –

40. The claim recites "occasionally change", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

41. Regarding claim 18 –

42. The claim recites "is changed as well as to prevent . . .". wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

43. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

44. The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

45. Claims 1-2, 4-10, 12 - 15, 17-19, 21-23, 31-32, and 34-42 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

46. A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. *In re Katz* Interactive Call Processing Patent Litigation, 639 F.3d 1303 (Fed. Cir. 2011).

47. The claims recite multiple instances of apparatus and method steps of using the apparatus –

- Claim 2 --- "a randomly generated" (*Katz, UltimatePointer*).
- Claim 4 --- "occasionally change".
- Claim 5 --- "… change from time to time", "… making… anonymous over time…".
- Claim 6 --- "which is used…".
- Claim 15 --- "wherein . . . the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"
- Claim 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"
- Claim 18 --- "… and is generated algorithmically and only known to at least one of the servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"
- Claim 23 --- "wherein no connection is made between the mobile wireless device …"

48. Regarding claim 13 –

49. The claim is directed to a device -- "upon the mobile wireless device". However the device is also used to describe a limitation -- "by the mobile wireless device", "wherein the mobile wireless

device". This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

50. Regarding claim 14 –

51. The claim recites "for execution upon the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. The scope is unclear (*In re Zletz*).

52. Regarding claim 15 –

53. The claim recites "wherein . . . . the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

54. Regarding claim 23 –

55. The claim recites "between the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

56. Regarding claim 32 –

57. Note that claim 31 is already performed, and the first limitation of claim 32 says claim 31 is performed under control of an application. So executing is unclear as the first limitation suggests that it was already executed.

58. Regarding claim 34 –

59. Claim 34 recites the limitation of "performing at least a portion of the steps on one or more processor of the one or more servers." Claim 31, on which claim 34 depends, recites that all of the steps are performed at the mobile device. It is unclear to one of ordinary skill how at least a portion of the steps can be performed on a processor of a server when the steps are performed on a mobile device.

Claim Rejections - 35 USC § 103

60. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

61. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

62. Claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

63. Regarding claims 1 and 31-

64. Sundar teaches a mobile wireless device (abs) comprising:

a first radio; (par 59-60)

a second radio; (par 55-58, 65)

one or more processors: (par 59-65)

one or more non-transitory memory devices coupled to the one or more processors, (par 59-65) the one or more non-transitory memory devices storing a set of instructions that, when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers; (par 59-60)

receiving, using the second radio, a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices, each of the proximity beacon transmissions including a proximity beacon service identifier; (par 55-58, 65)

deriving proximity beacon information from the proximity beacon, transmissions; (par 58-59, 65)

determining that at least one beacon transmitter device, associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information; (par 58-59, 65) and

the proximity beacon being service identifier indicating the same for all proximity beacon transmissions are associated with the proximity beacon service and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service. (fig 2-3, par 14, 58-59)

65. Sundar does not specifically teach each of the proximity beacon transmissions including a MAC address and a unique identifier.

66. Park teaches teach each of the proximity beacon transmissions including a MAC address and a unique identifier. (par 18, 21, 23, 41, 43).

67. It would be obvious to one of ordinary skill in the art to combine Park and Sundar in order to obtain greater transaction security.

68. Regarding claims 6 and 35 –

69. Park teaches that at least a portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices. (par 18, 21, 23, 41, 43)

70. Regarding claim 7 –

71. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the downloaded unique

identifier with the portion of the proximity beacon information, the portion comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 58-59, 65)

72. Regarding claim 8 –

73. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers. (par 58-59, 65)

74. Regarding claim 9 –

75. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that a specific beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the proximity beacon information with the identifier related information. (par 58-59, 65)

76. Regarding claim 10 –

77. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device by associated with the beacon service is in proximity to the mobile wireless device, by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radios and receiving, in response to the sending, at least a portion of the identifier related information used in the determining step. (par 58-59, 65)

78. Regarding claim 12 –

79. Sundar teaches that the one or more processors further execute the instructions to perform operations including determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location. (par 58-59, 65)

80. Regarding claim 13 –

81. Sundar teaches that the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including downloading the application software in reaction to sending of a unique identifier by the mobile wireless device to at least one server of the one or more servers, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information. (par 58-59, 65)

82. Regarding claim 14 –

83. Sundar teaches that the identifier related information comprises application software for execution upon the mobile wireless device. (par 58-59, 65)

84. Regarding claim 19 –

85. Sundar teaches that the second radio is one of a Bluetooth based radio or a Wi-Fi- based radio. (par 10)

86. Regarding claim 34 –

87. Sundar teaches performing at least a portion of the steps on one or more processors of the one or more servers. (par 59-65)

88. Regarding claim 36 –

89. Sundar teaches that the identifier related information is received in response to software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information. (fig 2-3, par 14, 58-59)

90. Regarding claim 38 –

91. Sundar teaches determining that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device utilizing both the identifier related information and the proximity beacon transmissions. (fig 2-3, par 14, 58-59)

92. Regarding claim 39 –

93. Sundar teaches performing further actions based upon the proximity beacon information and the identifier related information. (par 55-58, 65)

94. Regarding claim 40 –

95. Sundar teaches that determining, at the mobile device, that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device additionally comprises utilizing an action function including one or more previously downloaded unique identifiers. (fig 2-3, par 14, 58-59).

96. Claims 2, 4-5, 15, 17-18, 21-22, and 41-42 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Sugiyama et al (US 2006/0032901).

97. Sundar and Park teach as above.

98. Regarding claims 2 and 41 –

99. Sugiyama teaches that the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD ADDR. (par 26-28).

100. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with Sugiyama in order to obtain greater transaction security.

101. Regarding claims 4 and 42 –

102. Sugiyama teaches that both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change; (par 26-28) and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices. (par 26-28)

103. Regarding claim 15 –

104. Sundar teaches that the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further associated with an entity included within the list of contact information based upon comparing a contact identifier information with at least the portion of the proximity beacon information, and the mobile wireless device, upon determining there is a match, engaging in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, (fig 2-3, par 14, 58-59) and further

wherein the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification. (fig 2-3, par 14, 58-59).

105. Sugiyama teaches a MAC address that changes from time to time. (par 26-28)

106. Regarding claim 17 –

107. Sugiyama teaches that the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one sewer of the one or more servers. (par 26-28)

108. Regarding claim 18 –

109. Sugiyama teaches that the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further wherein, the MAC address associated with the

beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices. (par 26-28)

110. Regarding claim 21 –

111. Sugiyama teaches that teaches that the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time (par 26-28)

112. Sundar teaches one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more servers to access the identifier related information, and with at least the portion of the identifier related information including a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter ; and wherein the one or more processors further execute the instructions to perform operations, including determining the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (fig 2-3, par 14, 58-59)

113. Regarding claim 22 –

114. Sundar teaches that the one or more processors further execute the instructions to perform additional operations, including determining the proximity by utilizing an action function including one or more previously downloaded unique identifiers. (fig 2-3, par 14, 58-59)

115. Claim 23 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Landau (US 2005/0099291)

116. Sundar and Park teach as above.

117. Regarding claim 23 –

118. Landau teaches that the proximity beacon service utilizes a protocol that includes unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are

transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon service identifier is included within one or more configurable fields of the unsolicited automatically repetitive advertisements and, wherein no connection is made between the mobile wireless device and the plurality of beacons transmitter devices in order to receive the unique identifier. (par 43, 95)

119. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with and Landau in order to obtain greater transaction security.

120. Claim 32 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Sorenson et al (US 2003/0053484).

121. Regarding claim 32 –

122. Sundar and Park teach as above.

123. Sorenson teaches performing one or more steps of the method under control of an application via a software interface; and executing the application on the mobile device. (par 135)

124. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with Sorenson in order to achieve a more user-friendly method.

125. Claim 37 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Brackett et al (US 2005/0114654).

126. Sundar and Park teach as above.

127. Regarding claim 37 –

128. Sundar teaches determining the at least one beacon transmitter device is in proximity. (fig 2-3, par 14, 58-59).

129. Brackett teaches at least one server of the one or more of servers providing an identifying picture of a consumer to at least one device for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction. (par 20)

130. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with the facial recognition feature of Brackett in order to obtain greater transaction security.

Conclusion

131. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRISTINA OWEN SHERR whose telephone number is (571)272-6711. The examiner can normally be reached on 8:30 - 5:30.

132. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

133. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Calvin L Hewitt can be reached on 571-272-6709. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

134. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mohammad A. Nilforoush/
Primary Examiner, Art Unit 3685

Notice of References Cited	Application/Control No. 15/271,410	Applicant(s)/Patent Under Reexamination	
	Examiner CRISTINA O SHERR	Art Unit 3685	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20160025837-A1	01-2016	Hillier; Peter M.	G01S5/0054	342/386
*	B	US-20130217332-A1	08-2013	Altman; Steven R.	H04H60/90	455/41.2
*	C	US-20030053484-A1	03-2003	Sorenson, Donald C.	H04J4/00	370/468
*	D	US-20050114654-A1	05-2005	Brackett, Charles Cameron	G06F21/32	713/161
*	E	US-20050099291-A1	05-2005	Landau, Steven	A61H3/061	340/539.13
*	F	US-20060032901-A1	02-2006	Sugiyama; Toshiharu	G07C9/00103	235/375
*	G	US-20030134650-A1	07-2003	Sundar, Rangamani	H04W48/18	455/465
*	H	US-20060104200-A1	05-2006	Park; Jae-Hyun	H04W88/06	370/216
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	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6,233,565	B1	2001-05-15	Lewis et al.	
	2	7,003,283	B1	2006-02-21	Hiltunen et al.	
	3	7,010,267	B1	2006-03-07	Vanluijt et al.	
	4	7,340,438	B1	2008-03-04	Nordman et al.	
	5	7,515,914	B1	2009-04-07	Herrod et al.	
	6	7,877,082	B1	2011-01-25	Eagle et al.	
	7	8,089,405	B1	2012-01-03	Piersol et al.	
	8	8,576,846	B1	2012-11-05	Kumar et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.O.S/

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	9	9,137,012	B1	2015-09-15	Bailey et al.	
	10	7,886,962	B2	2011-02-15	Vawter et al.	
	11	ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.O.S/ 7,174,031	B2	2007-02-06	Rhoads et al.	
	12	7,991,644	B2	2011-08-02	Bryant et al.	
	13	8,254,338	B2	2012-08-28	Anschutz et al.	
	14	7,580,699	B1	2009-08-25	Shaw et al.	
	15	7,522,058	B1	2009-04-21	Light et al.	
	16	7,942,337	B2	2011-05-17	Jain	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030200489	A1	2003-10-23	Hars	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	2	20030200140	A1	2003-10-23	Hars	
	3	20040243519	A1	2004-12-02	Perttila	
	4	20050188062	A1	2005-08-25	Li et al.	
	5	20070242643	A1	2007-10-18	Chandra et al.	
	6	20080045236	A1	2008-02-21	Nahon	
	7	20080108308	A1	2008-05-08	Ullah	
	8	20040186768	A1	2004-09-23	Wakim et al.	

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Social Serendipity: Mobilizing Social Software, Eagle et al., Pervasive Computing, 1536-1268, pp. 28- 34 (2005)	
	2	Beacon-Stuffing: Wi-Fi Without Associations, Chandra et al., IEEE Computer Society, 1550-6193, pp. 53-57 (2007)	

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EXAMINER SIGNATURE

Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/25/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr. Reg No 31671/	Date (YYYY-MM-DD)	2018-07-20
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Approved for use through 08/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 15/271,410 First Named Applicant: James Arthur Proctor
Examiner: SHERR, MARIA CRISTI OWEN Art Unit: 3685 Status of Application: Non-Final Rejection Mailed

Tentative Participants:
(1) David J. Thibodeau, Jr. (2) James A. Proctor

(3) SHERR, MARIA CRISTI OWEN (4)

Proposed Date of Interview: January 23, 2019 **Proposed Time:** 2:00 (◎AM◎PM)

Type of Interview Requested:
(1) ☑ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☑ NO
If yes, provide brief description:

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) 35 USC 103	All	Sundar and Park	☐	☐	☐
(2) 35 USC 112 second	All		☐	☐	☐
(3) 35 USC 101			☐	☐	☐
(4)			☐	☐	☐

☐ Continuation Sheet Attached ☑ Proposed Amendment or Arguments Attached

Brief Description of Arguments to be Presented: The Applicant proposes focusing the discussion on (a) the rejection of the claims under 35 USC 103 in view of Sundar and Park (b) the 35 USC 112 second paragraph rejections.

An interview was conducted on the above-identified application on

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/David J Thibodeau Jr Reg No 31671/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

David J. Thibodeau, Jr.
Typed/Printed Name of Applicant or Representative

1-617-925-5520
Applicant's/Applicant's Representative's Telephone Number

31671
Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 24 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.

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PTOL-413A (08-10)
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Electronic Acknowledgement Receipt

EFS ID:	34906828
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
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Time Stamp:	19:47:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	20190118_111054-0001U4C7_TPO_Applicant-Initiated_Interview_Request.pdf	350623 5ea6eae53ff4f1ec7c0b943ad871ff431363ea9e	no	3

Warnings:

Information:					
2	Miscellaneous Incoming Letter	20190118_111054-0001U4C7_unoffical_communication.pdf	231183 d64674470dca4523f0ab5dbc3c3e4d5d243608d0	no	24
Warnings:					
Information:					
			Total Files Size (in bytes):	581806	

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National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

UNOFFICIAL COMMUNICATION

DRAFT RESPONSE TO OFFICE ACTION

This amendment is being filed in response to the Office Action dated November 19, 2018. Further consideration of the application is respectfully requested.

Amendments to the clams begin on page 2.

Remarks begin on page 12.

IN THE CLAIMS

The following replaces all prior listings of the claims in the application:

1. (Currently Amended). A mobile wireless device comprising:

a first radio;

a second radio;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

receiving, using the second radio, ~~a plurality of short range transmissions, including~~ a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a ~~respective~~ MAC address, a ~~respective~~ unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~deriving proximity beacon information from the proximity beacon transmissions;~~

determining ~~that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information and~~ if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and ~~indicating~~ indicates the particular short range transmission is a proximity beacon transmission ~~are~~ associated with the proximity beacon service, ~~and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

and if so, executing instructions that include:

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device.

2. (Currently Amended). The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

3. (Cancelled).

4. (Currently Amended). The mobile wireless device of claim 1 wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change ~~; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~.

5-7. (Cancelled).

8. (Currently Amended). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers ~~as identifier related information~~.

9. (Cancelled).

10. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by:

sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio; and

receiving, in response to the sending, at least a portion of the identifier related information used in the determining step.

11. (Cancelled).

12. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including

determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location.

13. (Currently Amended). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including:

downloading the application software in reaction to sending of the unique identifier by the mobile wireless device to at least one server of the one or more servers~~,~~ ~~and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information~~.

14. (Cancelled)

15. (Previously Presented). The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further associated with an entity included within the list of contact

information based upon comparing a contact identifier information with at least the portion of the unique identifier, and

the mobile wireless device, upon determining there is a match, engaging in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Cancelled).

17. (Currently Amended). The mobile wireless device of claim 1 ~~wherein the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more servers~~ wherein the the one or more processors further execute the instructions to perform operations including

receiving, via a second radio, the plurality of short range transmissions further includes receiving a first UID at a first time that is different from a second UID received at a second time.

18. (Currently Amended). The mobile wireless device of claim 1 wherein the one or more processors further execute the instructions to perform operations including:

~~the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further~~

~~wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices~~

receiving, via a second radio, the plurality of short range transmissions further includes receiving a first UID and a first MAC address associated with the beacon transmitter that have initial respective values at a first time, and subsequently receiving a second UID and second MAC address from the same beacon transmitter but which that have different respective values than the initial respective values.

19-30. (Cancelled).

31. (Currently Amended) A method for facilitating use of proximity beacons, the method executing within a mobile device, and the method comprising:

communicating between the mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier;~~

~~wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so,

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device.

32-34. (Cancelled).

35. (Previously Presented). The method of claim 31, wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices.

36-40. (Cancelled).

41. (Previously Presented). The method of claim 31 wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

42. (Previously Presented). The method of claim 31 additionally comprising:

detecting a changed ~~wherein both the~~ MAC address and ~~the~~ unique identifier as received by the second radio from a single beacon transmitter device ~~occasionally change~~; and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices.

43. (New) A method for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity

beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

wherein the MAC addresses and unique identifiers associated with the received proximity beacon transmissions from each of the one or more beacon transmitter devices associated with the proximity beacon service occasionally change;

determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device; and

wherein the instructions further comprise sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

44. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving the identifier related information in response for use in the utilizing step.

45. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

48. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

comparing the identifier related information with the unique identifier to determine if an entity or object is within proximity to the mobile device.

49. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving the identifier related information in response for use in the utilizing step.

50. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

51. (New) The method of Claim 50, wherein the further information relates to one or more of the following:

a loyalty program;

a payment service; or

a coupon relating to an entity in proximity to the mobile device;

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device, for use in purchasing items, and allowing for the user take delivery at or near the location of a fixed proximity beacon device.

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device.

54. (New) The method of Claim 53, wherein the application is a multiuser game. additionally comprising:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

56. (New) The method of Claim 31, additionally comprising:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

57. (New) The method of Claim 1, wherein the instructions further comprise:

comparing the identifier related information with the unique identifier to determine if an entity or object is within proximity to the mobile device.

58. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and the one or more servers performing the following steps:

associating an object or entity as being within proximity to the mobile device,

storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior;

retrieving a stored user email address associated with an account associated with the mobile device; and

sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.

REMARKS

Claim Rejections – 35 USC 101

All of the prior claims were rejected under 35 U.S.C. 101 on the asserted basis that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

Applicant respectfully traverses the rejection. The USPTO recently made its 2019 Revised Patent Subject Matter Eligibility Guidance effective January 7, 2019 (hereafter the "2019 Guidance") for all pending applications. The 2019 Guidance acknowledges that a claim that integrates a judicial exception into a practical application that imposes a meaningful limit on the judicial exception is not "directed to" a judicial exception, thereby making the claim eligible for patenting under 35 U.S.C. 101.

Applicant respectfully submits that the claims as both previously presented and as currently amended are eligible for patenting at least because the claims integrate subject matter into a practical application, as discussed in detail below.

However, before discussing application of the 2019 Guidance in further detail, Applicant respectfully submits that the amendments accompanying this response further clarify certain aspects of the claims as being performed by a computing system that processes information received via a first radio and a second radio, which is an example of a physical machine. The current amendments also specify how a computing system operates, or how it performs the recited processes in a manner that integrates the claimed subject matter into a practical application.

For example, apparatus claim 1 as currently amended provides that one or more processors execute instructions to perform operations including determining if a particular type of radio transmission – a short range radio transmission - is of a particular type (that is, whether the short range transmission (a) includes a MAC address and (b) has a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service). Claim 1 as currently amended also further requires then, and only then, executing instructions to determine if an object or entity of a particular type – one associated with a proximity beacon service - is within proximity to the mobile wireless device in a specific way. That specific way requires utilizing both the identifier related information and the UID as were previously received, respectively, from a first radio and a second radio. Method claim 31 is amended similarly to claim 1.

Turning now to the 2019 Guidance, Step 1 of the eligibility inquiry asks whether the claimed subject matter is directed to a statutory category under 35 U.S.C. 101. Applicant respectfully submits that claim 1 and the claims that depend from it each recite an apparatus having a first and second radio, one or more processors, and one or more non-transitory memory devices, which is an example of a machine. Claim 31 and the claims that depend from it each recite a method having a series of steps performed by a computing system, which is an example of a process. Therefore, all pending claims recite statutory categories of subject matter under Step 1.

Prong 1 of revised Step 2A of the 2019 Guidance asks whether the claims recite a judicial exception. The 2019 Guidance offers the following three categories of judicial exceptions:

1. Mathematical concepts like mathematical relationships, formulas, and calculations;

2. Certain methods of organizing human interactions, such as fundamental economic practices commercial and legal interactions; managing relationships or interactions between people; and advertising, marketing, and sales activities; and

3. Mental processes, which are concepts performed in the human mind, such as forming an observation, evaluation, judgment, or opinion.

According to the 2019 Guidance, for each alleged judicial exception, the Examiner must

(a) identify the specific limitation(s) in the claim that the Examiner believes recites an abstract idea, and (b) determine whether the identified limitation(s) falls within the subject matter groupings of abstract ideas, as listed above. The Office action (admittedly mailed prior to publication of the 2019 Guidelines) identifies the claims as being directed to the supposed abstract idea of " determining whether a device is in proximity to an access point". The Office action characterized the claim as merely "an algorithm that involves receiving a list of identifiers or locations[1], determining the location of a device, and determining that the device is in proximity to one of the locations on the list" and that "the transaction device in this claim[2] merely automates this algorithm, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself." (see Par 30 of the Office Action).

Applicant respectfully submits that none of the above concepts identified by the Office action fall within the three judicial exceptions set forth by the 2019 Guidance. Specifically, the claims do not recite any mathematical concept, or method of organizing human interaction, or mental process, even under a broadest reasonable interpretation. Regarding mental processes, a human cannot on its own detect whether a first radio has

[1] The claims do recite two different types of identifiers, but do not recite or mention a "list of locations".
[2] There is no "transaction device" in independent claim 1 or claim 31 – nor has there ever been.

received a certain type of transmission or whether a second radio has also received a certain type of short range transmission. The claimed further apparatus features and process steps of determining whether an entity or object is within proximity to the mobile wireless device is also not practically performed in the human mind, because it requires a processor accessing computer memory to compare MAC addresses, unique identifiers (UID), and proximity beacon service identifiers (PBSI) received from those two radios. See e g., claim 2 of "Example 37" of "Subject Matter Eligibility Examples: Abstract Ideas" published by the Office with the 2019 Guidance.

Because the claims do not recite a judicial exception, Applicant respectfully submits that the claims are eligible for patenting under 35 U.S.C. 101 for at least this reason.

However, even if when the claims can be said to be "directed to" an abstract idea, the analysis does not end there. Prong 2 of revised Step 2A of the 2019 Guidance requires then asking whether the alleged judicial exception is "integrated into a practical application in a manner that imposes a meaningful limit on the judicial exception". Applicant respectfully submits that the claims here recite a combination of additional features, that as a whole, integrates any alleged judicial exception of the claims into a practical application.

For example, the claims recite determining that a particular type of entity or object is within proximity to the wireless device – that is, an entity or object associated with a particular proximity beacon service. The determination is also made in a very specific way. First, the first and second radio must have each received a certain type of transmission - a short range transmission (a) that includes a MAC address and (b) a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service. The claims as currently amended also further require then, ***and only then***, executing instructions to determine if the object or entity related to the beacon service is within proximity. Furthermore, that determination is made in a

specific way – that is by utilizing the identifier related information and the UID as were previously received from the first and the second radios[3].

Hence, the claims recite a specific manner of determining whether a device is in proximity to an entity or object associated with the beacon service.

Applicant respectfully submits that the above features, in combination with the remaining features of the claims, address a problem specifically arising in wireless communications technology and improve the functioning of a system that includes computer-connected radios. For example, as set forth by the specification, the claimed subject matter now enables advantages such as:

> The method of exchanging identifiers to confirm that the entity or object in proximity, is in fact, associated with a particular beacon service, reduces the amount of data that would otherwise be transmitted.
>
> The use of downloaded identifiers to perform the detection of a proximal device has significant power saving benefits. When a beacon is identified as being associated with the proximity beacon service for example, power consumption of the wireless devices is reduced due to reduced processing requirements for the detection of beacon transmissions and resulting processing of associated information and interaction with the server.
>
> In some embodiments as recited in the dependent claims, the invention also permits two devices to continue to communicate after they move away from each other, via the connections established with the server. Such a benefit is an innovation over pure peer to peer communication

[3] The Office Action also ignores these specialized features of the claim. The does not merely recite "a mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices" as asserted in Par 31.

> which is limited to only communicating when the two devices are in proximity, disconnecting as they move apart.
>
> In other embodiments, as recited in the dependent claims, changing wireless identifiers permits communication between the two devices to remain secure, even after their identifiers were initially exchanged to determine proximity.

In view of the above, the claimed subject matter addresses problems specifically and only arising in computer-related technology in a manner that improves the functioning of a computer-related communication system. Therefore, the claimed subject matter does more than merely recite instructions to apply a judicial exception using a generic computer. Furthermore, because the claimed subject matter addresses a problem specifically arising in computer-related technology in a manner that improves the functioning of a computer-controlled radio, the claims impose meaningful limitations on practicing the abstract idea. For example, the claimed subject matter does not preempt other approaches that determine the proximity of two things that do not recite the specific ordered combination of features recited by the claims. Therefore, the claimed subject matter is directed to a practical application that imposes meaningful limits on practicing the judicial exception.

Even if the Examiner maintains that the claimed subject matter is not eligible for patenting under revised Step 2A, Applicant respectfully submits that the claimed subject matter is eligible under Step 2B. First, in considering the eligibility of the claims under Step 2B, the Examiner is must establish that all features of the claim individually are merely routine or conventional. Applicant respectfully submits that the Office action has not established by substantial evidence that any or all features of the claims are merely routine or conventional as required by precedential decisions, such as *Berkheimer v. HP, Inc.*, 881 F.3d 1360 (Fed Cir. 2018) CAFC Appeal No. 2017-1437.

Furthermore, even if the Examiner maintains that all features of the currently amended claims are merely routine or conventional, Applicant respectfully submits that, as an ordered combination, the subject matter of the claims provides significantly more that transforms the alleged abstract idea into patent eligible subject matter. For example, as discussed above, the claims as an ordered combination enable a wireless device that includes a computer connected to a first and second radio to determine whether an entity or object associated with a proximity beacon service is in proximity. The specification discusses numerous advantages of the claimed approach, as explained reproduced above. Applicant's claims therefore entail an unconventional technological solution to a technological problem. Accordingly, Applicant's claims are eligible for patenting under Step 2B.

In view of the above, Applicant respectfully requests that the rejection under 35 U.S.C. 101 be withdrawn in its entirety.

Claim Rejections – 35 USC 112(pre-AIA) – First Paragraph

Regarding claims 4 and 18, and as explained in the Applicant's prior submission, the specification clearly provides that the identifiers can be changed over time. As one example, support for claim 4's recitation of changing MAC addresses is found in the application at page 7, lines 3-6. There it is explained that "By using a central server, the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device."

In one example implementation using a Bluetooth local link, at paragraph (page 15, lines 23-24 of the application as filed), "the BD ADDR or MAC address of the Bluetooth device can be used as the identifier".

The specification therefore describes an embodiment where the BR ADRR or the MAC address can be changed, and that it can be used as the identifier in certain Bluetooth embodiments.

The Office Action provide no reason why those sections of the specification are inadequate support for claims 4 and 18.

Claim Rejections – 35 USC 112(pre-AIA) – Second Paragraph

The claim formats adopted by the Applicant are expressly permitted and encouraged.

The legal test for definiteness under 35 USC 112, second paragraph is actually whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed Cir. 1986) (citations omitted).

The claims in question, certainly as now amended, also each recite a logical and operative device (in the case of claim 1) and a logical and operative method (in the case of claim 31) that are understood by one of skill in the art.

In addition, the Office Action provides no explanation for why the format adopted for claim 1 – a processor programmed to perform a series of steps - is not a proper form. For a claim in such as format has repeatedly been recognized by both the Court and the Patent Office itself.

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of

information in the intended computer system, established a functional relationship such that the claimed attribute data objects were given patentable weight. See *In re Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp.*, 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Texas Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), *finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite* (See *MasterMine*, slip op. at 14).

Claims 31-32, 35-37 and 40-41 are method claims. Lacking any specific identification or reason in the Final Office Action, these method claims must be presumed to not improperly recite functions of an apparatus.

Claim Rejections – 35 USC 103

Claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

The other, dependent claims also stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) in combination with other references such as Sugiyama et al (US 2006/0032901) or Landau (US 2005/0099291) or Sorenson et al (US 2003/0053484) or Brackett et al (US 2005/0114654).

Reconsideration and withdrawal of this rejection is respectfully requested.

Sundar teaches downloading "SSID"s to a mobile device, in order to qualify if the detected wireless access point will allow for authentication of the mobile device to the WiFi voice network using that access point.

The Office Action considers this feature of Sundar as being the same thing as the Applicant's claimed "downloading identifier related information", and "detecting the proximity of one or more beacon devices associated with the proximity beacon service." The Office Action then points to Park as teaching each proximity beacon transmission may include a MAC address and a unique identifier (referencing Park at Pars 18, 21, 23, 41, 43, Par 66 of office action) and concludes it would have been obvious to one of ordinary skill in the art to combine Park and Sundar "in order to obtain greater security."

Applicant must respectfully disagree because (A) there would be no motivation to combine Sundar and Park and (B) even if their teachings could be combined, one would not arrive at all of the features recited in the claims.

(A) Sundar and Park Cannot be Combined; or at least There Would be No Motivation to Combine them as they are Intended for Different Purposes

First, there is no indication in either Park nor Sunder that such a combination would provide any benefit to security, how that security might be achieved, or to what aspect that security addresses.

Second, and more important to observe, is that Sundar is operating in a "infrastructure mode", e.g. using an Access Point (AP) to control communication. However, Park's system (cited by the examiner at Par s18, 21, 23, 41 and 43 and relating to Fig. 3), is

instead operating in an 802.11 (WiFi) Ad-Hoc mode, and has a differing format from the beacon transmissions of Sundar. That is, Sundar's Access points cannot transmit the ad-hoc transmissions (the "auto switch request packet" of Park). Therefore for this reason alone, one could not combine Park and Sundar, and certainly would not be motivated to look to the ad-hoc network of Park when adapting the access point system of Sundar, since the transmitter of Sundar operates in a non-compatible mode of the very same wireless system (802.11) of Park (ad-hoc mode of wi-fi rather than the AP/infrastructure mode).

Third, the goals of Sundar and Park are completely different, and do not address the same problems. Sundar looks to determine if the "SSID" or network name of the communication network is one in which it can gain access to its voice services successively so as to not waste its resources attempting to access a system such is not able to gain access to the voice systems via the detected Wi-Fi network. Park, on the other hand, is directed to creating a direct ad-hoc connection between two terminals, if the intervening access point malfunctions. This is done by sending an "auto switch packet" from one terminal directly to the other to bypass the access point altogether.

Fourth, the use of downloaded SSIDs from the servers of Sundar to a mobile device would not help the two terminals achieve the establishment of an alternate direct communication link between them, and provides no benefit to security or either of the goals of Sundar or Park. This is because all of the intimation relating to the establishment of the ad-hoc direct communication link by one terminal used to send the "auto switch packet" to the other is already known to both terminals PRIOR to the need to send the cited ad-hoc packet (see Par 41 and 43). Therefore there would be no benefit to this combination in either of the objectives of Park or Sundar, or in the third objective of "security", not mentioned by either Park or Sundar.

(B) Even the Combination of Sundar and Park does not Provide All of the Elements of the Applicant's Claims

The auto-switch packet of Park *does not include both a unique identifier relating to the transmitter, and a MAC address.* It contains the transmitting MAC address, the receiving MAC address, the SSID (identifying the communication network between the two terminals), and a BSSID (identified as the targeted "corresponding device" identifier). On the other hand, the Applicants claims – certainly as now amended, utilize both the identifier and the identifier related information to determine proximity of the transmitting device, not the receiving device.

Therefore this limitation recited in claim 1 (and all other claims) is not met, even if the references could be combined, and one was motivated to do so, (which they would not).

Neither Park or Sundar touch sending a detected identifier to a server and receiving the identifier related information back in response. As this feature is recited in at least some of the claims, such as claim 10, at least those claims should be allowed.

Also, neither Sundar nor Park teach "downloading a unique identifier" (*in addition* to the SSID of Sundar) from a server, as recited in dependent claims 6 and 7:

Claims 4 furthermore requires "changing of both MAC and unique identifier". The Office Action rejected Claim 4 based upon Sundar in view of Park in further view of Sugiiyama. But Sugiiyama is related to RFID devices, *which do not include MAC addresses*. The is no mention of a MAC address in the cited paragraphs. Furthermore, the proposed combination of a WiFi access point (Sundar) with an ad-hoc mode terminal (as in Park) and using an RFID protocol is not interoperable in any straight forward way. One would not be motivated to combine these diverse wireless systems, as they are from different field of endeavors, address dissimilar problems, and use incompatible protocols.

Also, Sundar teaches encrypting an identifier. But encrypting the MAC address od Sundar would not function within the teachings of Park – because a device's MAC address must be known in order to utilize the ad-hoc communications. In other words, an encrypted MAC address, which changed over time would "break" the operation of either Park or Sundar making their individual systems inoperable. Therefore one would not be motivated to combine these references, to arrive at the claimed combination of claims 4 and 5, even if a MAC address were disclosed within Sugiiyama (which it is not).

(C) The Claims as Now Amended Certainly Distinguish over Sundar and Park

The new limitations of the independent claims below provide further distinctions over Park and Sundar. For example, claim 1 now recites the following:

> determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:
>
> utilizing the identifier related information and the unique identifier to determine if an entity or object associated is within proximity to the mobile device.

Nowhere does Sundar or Park contemplate the advantage of using a PBSI together with both identifier related information and a unique identifier to determine when an object is in proximity.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/28/2019	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
TONI HAKIM

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

RESPONSE TO OFFICE ACTION

This amendment is being filed in response to the Office Action dated November 19, 2018. Further consideration of the application is respectfully requested.

Amendments to the claims begin on page 2.

Remarks begin on page 12.

IN THE CLAIMS

The following replaces all prior listings of the claims in the application:

1. (Currently Amended). A mobile wireless device comprising:

a first radio;

a second radio;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

receiving, using the second radio, a plurality of short range transmissions, including a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier , and a proximity beacon service identifier (PBSI);

~~deriving proximity beacon information from the proximity beacon transmissions;~~

determining ~~that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information; and~~

if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) includes the proximity beacon service identifier (PBSI) and if c) the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service; ~~and~~

~~the proximity beacon service identifier indicating the proximity beacon transmissions are associated with the proximity beacon service, and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

then:

determining if an entity or object associated with the proximity beacon service is in proximity to the mobile wireless device, by utilizing the identifier related information and the unique identifier.

2. (Currently Amended). The mobile wireless device of Claim 1, wherein the MAC address ~~is selected from a groip consisting of (a)~~ is a randomly generated 48 bit number matching a format of ~~a MAC address and (b)~~ a Bluetooth BD_ADDR.

3. (Cancelled).

4. (Currently Amended). The mobile wireless device of claim 1 ~~wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change ; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~.

wherein the one or more processors further execute the instructions to perform operations including:

receiving, by the second radio, a first proximity beacon transmission including a first MAC address and a first unique identifier at a first time; and

receiving, by the second radio, a second proximity beacon transmission including a second MAC address and a second unique identifier at a second time, the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier; and

associating the first and second unique identifier with a single beacon transmitter device.

5-7. (Cancelled).

8. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers.

9-11. (Cancelled).

12. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including

determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location.

13. (Currently Amended). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including:

~~downloading the application software in reaction to~~ sending of ~~a~~ the unique identifier by the mobile wireless device to at least one server of the one or more servers; and

in response to the sending of the unique identifier, downloading the application software.

~~and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information~~.

14. (Cancelled)

15. (Currently Amended). The mobile wireless device of Claim ~~1~~ 4 wherein the identifier related information comprises a list of contact information, and

the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further ~~associated~~ matched with an entity included within the list of contact information based upon comparing a contact identifier information with at least the portion of the unique identifier, and

the mobile wireless device, upon determining there is a match, ~~engaging in further steps to~~ allowing further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio~~, and further~~

~~wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification~~.

16. (Cancelled).

17. (Currently Amended). The mobile wireless device of claim 1 ~~wherein the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more servers~~

wherein the one or more processors further execute the instructions to perform operations including:

receiving, via a second radio, the plurality of proximity beacon transmissions further includes receiving a first unique identifier at a first time that is different from a second unique identifier received at a second time; and

associating the first and second unique with a single beacon transmitter device.

18-30. (Cancelled).

31. (Currently Amended) A method for facilitating use of proximity beacons, the method executing within a mobile device, and the method comprising:

communicating between ~~a~~ the mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including a plurality of proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~determining, at the mobile device, that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device by utilizing the identifier related information~~

~~wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier;~~

~~wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

a) determining that a particular short range transmission of the plurality of short range transmissions includes a MAC address,

b) determining that the proximity beacon service identifier (PBSI) is present, and

c) determining that the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service; and

when the three determining steps a) b) and c) are each true, then d) determining that an entity or object associated with the proximity beacon service is within proximity to the mobile device, by utilizing the identifier related information and the unique identifier.

32-34. (Cancelled).

35. (Currently amended). The method of claim 31, ~~wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices~~

wherein a first one of the plurality of proximity beacon transmissions received at a first time includes a first unique identifier, and wherein a second one of the plurality of proximity beacon transmissions received at a second time includes a second unique identifier the second unique identifier being different from the first unique identifier; and

associating both the first unique identifier and the second unique identifier with a particular entity or object in proximity to the mobile device.

36-40. (Cancelled).

41. (Previously Presented). The method of claim 31 wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

42. (Currently Amended). The method of claim 31~~wherein both the MAC address and the unique identifier as received by the second radio from a single beacon transmitter device occasionally change; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~

wherein a first one of the plurality of proximity beacon transmissions is received at a first time and includes a first unique identifier and first MAC address, and the Proximity beacon Service Identifier (PBSI), and wherein a second one of the plurality of proximity beacon transmissions received at a second time includes a second unique identifier different from the first unique identifier and a second MAC address different from the first MAC address, and the proximity beacon service identifier; and

associating both the first unique identifier and the second unique identifier with the same entity or object in proximity to the mobile device.

43. (New) A method for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from a beacon transmitter device associated with a proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier, and a proximity beacon service identifier (PBSI);

wherein the MAC addresses and unique identifiers associated with the proximity beacon transmissions as received from the beacon transmitter device associated with the proximity beacon service occasionally change;

wherein the receiving, at the mobile device using the second radio, the proximity beacon transmissions occurs without first transmitting, by the mobile device, to the beacon transmitter device; and

when a particular short range transmission:

a) includes a MAC address; and

b) includes a proximity beacon service identifier (PBSI); and

c) the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service,

then performing additional steps including:

determining that an entity or object associated with the proximity beacon service is within proximity to the mobile device, by utilizing the identifier related information and the unique identifier;

sending the unique identifier, using the first radio, to at least one server of the one or more servers; and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

44. (New) The method of Claim 31, further comprising

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

45. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

48. (New) The method of Claim 31, further comprising:

receiving, using the first radio, access code information by the mobile device from at least one of the servers; and

utilizing the access code information to gain access to the entity or object determined to be in proximity to the mobile device.

49. (New) The method of Claim 31, wherein receiving the identifier related information, using the first radio, is performed in response to sending at least the unique identifier to at least one of the one or more servers using the first radio.

50. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

51. (New) The method of Claim 50, wherein the further information relates to one or more of the following:

a loyalty program;

a payment service; or

a coupon relating to an entity in proximity to the mobile device; or

advertising content.

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device for use in purchasing items, and further comprising:

allowing for the user take delivery at or near the location of a fixed proximity beacon device.

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device.

54. (New) The method of Claim 53, wherein the application is a multiuser game.

55. (New) The method of Claim 31, additionally comprising:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

56. (New) The method of Claim 31, wherein the step of determining that an entity or object is within proximity further comprises:

comparing the identifier related information with the unique identifier or information derived from the unique identifier.

57. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and wherein the one or more servers perform the following steps:

associating an object or entity as being within proximity to the mobile device;

storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior;

retrieving a stored user email address associated with an account associated with the mobile device; and

sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.

58. (New) The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform the operations for determining that an entity or object is within proximity by further:

comparing the identifier related information with the unique identifier or information derived from the unique identifier.

59. (New) The mobile wireless device of Claim 1, wherein the receiving of the identifier related information, using the first radio, is performed in response to the one or more processors executing instructions for:

sending at least the unique identifier to at least one of the one or more servers using the first radio.

60. (New) The method of Claim 31, wherein the proximity beacon transmissions are received, at the mobile device, without requiring the mobile device to first perform a step of transmitting to the one or more beacon transmitter devices from which the plurality of proximity beacon transmissions are received.

REMARKS

Interview Summary

The Applicant thanks Examiners Sherr and Nilforoush for the courtesy of the telephone interview on January 23, 2019. It was confirmed that the Examiners would be applying the 2019 Revised Subject Matter Eligibility Guidance in any further consideration of the issues raised under 35 USC 101. A discussion was also had regarding the scope of the independent claims 1 and 31 (essentially as now presented with this amendment). Examiner Nilforoush indicated that the amended claims appeared to distinguish over the prior art of record, as more fully explained below.

January 18, 2019 Unofficial Submission

The Applicant had submitted an informal version of a proposed claim amendment on January 18, 2019 for the purposes of discussion during the interview of January 23, 2019. That submission was not a formal amendment of the claims, or a formal response under 37 CFR as it was clearly marked as such and was not signed. Confirmation that it was not made of record is requested. The amendments made above are with respect to the last formal amendments made with the response filed July 20, 2018.

Status of the Claims

With entry of the foregoing amendments, claims 1, 2, 4, 8, 12-13, 15, 17, 31, 35, and 41-60 are now in the application. Claims 1, 2, 4, 13, 15, 17, 31, 34 and 42 have been amended.

New claims 43-60 are added. Support for new claims 43-60 is found in the specification as filed, and in the priority applications, and in the claims as previously presented. See the reasons stated in the Applicant's prior response for the same or analogous language of the claims and support documents filed on July 20, 2018.

Support for certain other new claims 44, 46-48, 50-54 and 56-58 is further discussed in detail in the attached Appendix A. The citations in Appendix A should be considered to non-limiting examples as other support for these and other new claims is also present.

No new matter has been added.

Claim Rejections – 35 USC 101

All of the prior claims were rejected under 35 U.S.C. 101 on the asserted basis that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) "without significantly more".

Applicant respectfully traverses the rejection. The USPTO recently made its 2019 Revised Patent Subject Matter Eligibility Guidance effective January 7, 2019 (hereafter the "2019 Guidance") for all pending applications. The 2019 Guidance acknowledges that a claim that integrates a judicial exception into a practical application that imposes a meaningful limit on the judicial exception is not "directed to" a judicial exception, thereby making the claim eligible for patenting under 35 U.S.C. 101.

Applicant respectfully submits that the claims as both previously presented and as currently amended are eligible for patenting, at least because the claims integrate subject matter into a practical application, as discussed in detail below.

However, before discussing application of the 2019 Guidance in further detail, Applicant

respectfully submits that the amendments accompanying this response further clarify certain aspects of the claims as being performed by a computing system that processes information received via a first radio and a second radio, which is an example of a physical machine. The current amendments also specify how a computing system operates, or how it performs the recited processes in a manner that integrates the claimed subject matter into a practical application.

For example, apparatus claim 1 as currently amended provides that one or more processors execute instructions to perform operations including determining if a particular type of radio transmission – a short range radio transmission - is of a particular type (that is, whether the short range transmission (a) includes a MAC address and (b) has a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service). Claim 1 as currently amended also further requires then, and only then, executing instructions to determine if an object or entity of a particular type – one associated with a proximity beacon service - is within proximity to the mobile wireless device in a specific way. That specific way requires utilizing both the identifier related information and the UID as were previously received, respectively, from a first radio and a second radio. Method claim 31 is amended similarly to claim 1.

Turning now to the 2019 Guidance, Step 1 of the eligibility inquiry asks whether the claimed subject matter is directed to a statutory category under 35 U.S.C. 101. Applicant respectfully submits that apparatus claim 1, and the claims that depend from it, each recite an apparatus having a first and second radio, one or more processors, and one or more non-transitory memory devices, which is an example of a machine. Method claims 31 and 43, and the claims that depend from them, respectively, each recite a method having a series of steps performed by a computing system, which is an example of a process. Therefore, all pending claims recite statutory categories of subject matter under Step 1.

Prong 1 of revised Step 2A of the 2019 Guidance asks whether the claims recite a judicial

exception. The 2019 Guidance offers the following three categories of judicial exceptions:

> 1. Mathematical concepts like mathematical relationships, formulas, and calculations;
>
> 2. Certain methods of organizing human interactions, such as fundamental economic practices commercial and legal interactions; managing relationships or interactions between people; and advertising, marketing, and sales activities; and
>
> 3. Mental processes, which are concepts performed in the human mind, such as forming an observation, evaluation, judgment, or opinion.

According to the 2019 Guidance, for each alleged judicial exception, the Examiner must: (a) identify the specific limitation(s) in the claim that the Examiner believes recites an abstract idea, and (b) determine whether the identified limitation(s) falls within the subject matter groupings of abstract ideas, as listed above.

Here, the Office action (admittedly mailed prior to publication of the 2019 Guidelines) identifies the claims as being directed to the supposed abstract idea of " determining whether a device is in proximity to an access point". The Office action then characterizes the claim as merely being "an algorithm that involves receiving a list of identifiers or locations[1], determining the location of a device, and determining that the device is in proximity to one of the locations on the list" and that "the transaction device in this claim[2] merely automates this algorithm. The Office Action goes on to conclude that therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible

[1] The claims do recite two different types of identifiers, but do not recite or mention a "list of locations".

[2] There is no "transaction device" in independent claim 1 or claim 31 – nor has there ever been.

application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself." (see Par 30 of the Office Action).

Applicant respectfully submits that none of the above concepts identified by the Office action fall within the three judicial exceptions set forth by the 2019 Guidance. Specifically, the claims do not recite any mathematical concept, or method of organizing human interaction, or mental process, even under a broadest reasonable interpretation. Regarding mental processes, a human cannot on its own detect whether a first radio has received a certain type of transmission or whether a second radio has also received a certain type of short range transmission. The claimed further apparatus features and process steps of determining whether an entity or object is within proximity to the mobile wireless device is also not practically performed in the human mind, because they require a processor accessing computer memory to compare components of radio transmissions, including MAC addresses, unique identifiers (UID), and proximity beacon service identifiers (PBSI) received from those two radios. See e g., claim 2 of "Example 37" of "Subject Matter Eligibility Examples: Abstract Ideas" published by the Office with the 2019 Guidance.

Because the claims do not recite a judicial exception, Applicant respectfully submits that the claims are eligible for patenting under 35 U.S.C. 101 for at least this reason.

However, even if when the claims can be said to be "directed to" an abstract idea, the analysis does not end there. Prong 2 of revised Step 2A of the 2019 Guidance requires then asking whether the alleged judicial exception is "integrated into a practical application in a manner that imposes a meaningful limit on the judicial exception". Applicant respectfully submits that the claims here recite a combination of additional features, that as a whole, integrates any alleged judicial exception of the claims into a practical application.

Consider that the claims recite determining that a particular type of entity or object is within proximity to the wireless device – that is, an entity or object associated with a particular proximity beacon service. The determination is also made in a very specific way. First, the first and second radio must have each received a certain type of transmission - a short range transmission (a) that includes a MAC address and (b) a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service. The claims as currently amended also further require then, ***and only then***, executing instructions to determine if the object or entity related to the beacon service is within proximity. Furthermore, that determination is made in a specific way – that is, by utilizing the identifier related information and the UID as were previously received from the first and the second radios[3].

Hence the claims recite a specific manner of determining whether a device is in proximity to an entity or object associated with the beacon service.

Applicant respectfully submits that the above features, in combination with the remaining features of the claims, address a problem specifically arising in wireless communications technology and improve the functioning of a system that includes computer-connected radios. For example, as set forth by the specification, the claimed subject matter now enables advantages such as:

> The exchanging of identifiers to confirm that the entity or object in proximity, is in fact, associated with a particular beacon service, reduces the amount of data that would otherwise be transmitted.
>
> The use of the proximity beacon service identifier, and downloaded identifiers in some embodiments within the scope of the independent claims, to perform the detection of a proximal device has significant power saving benefits. When a beacon is identified as being associated with the proximity beacon service for example, power consumption of the

[3] The Office Action also ignores these specialized features of the claim. The does not merely recite "a mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices" as asserted in Par 31.

> wireless devices is reduced due to reduced processing requirements for the detection of beacon transmissions and resulting processing of associated information and reduced interaction with the server.
>
> In some embodiments as recited in the dependent claims, the invention also permits two devices to continue to communicate after they move away from each other, via the connections established with the server. Such a benefit is an innovation over pure peer to peer communication which is limited to only communicating when the two devices are in proximity, disconnecting as they move apart.
>
> In other embodiments, as recited in the dependent claims, changing wireless identifiers permits communication between the two devices to remain secure, even after their identifiers were initially exchanged to determine proximity.

In view of the above the claimed subject matter addresses problems specifically and only arising in computer-related technology in a manner that improves the functioning of a computer-related communication system. Therefore, the claimed subject matter does more than merely recite instructions to apply a judicial exception using a generic computer. Furthermore, because the claimed subject matter addresses a problem specifically arising in computer-related technology in a manner that improves the functioning of a computer-controlled radio, the claims impose meaningful limitations on practicing the alleged abstract idea. For example, the claimed subject matter does not preempt other approaches that determine the proximity of two things that do not recite the specific ordered combination of features recited by the claims. Therefore, the claimed subject matter is directed to a practical application that imposes meaningful limits on practicing the alleged judicial exception.

Even if the Examiner maintains that the claimed subject matter is not eligible for patenting under revised Step 2A, Applicant respectfully submits that the claimed subject matter is eligible under Step 2B. First, in considering the eligibility of the claims under Step 2B, the Examiner must establish that all features of the claim individually are merely routine or conventional. Applicant respectfully submits that the Office action has not established by substantial evidence that any or all features of the claims are merely

routine or conventional as required by precedential decisions, such as *Berkheimer v. HP, Inc.*, 881 F.3d 1360 (Fed Cir. 2018) CAFC Appeal No. 2017-1437.

Furthermore, even if the Examiner maintains that all features of the currently amended claims are merely routine or conventional, Applicant respectfully submits that, as an ordered combination, the subject matter of the claims provides significantly more that transforms the alleged abstract idea into patent eligible subject matter. For example, as discussed above, the claims enable a wireless device that includes a computer connected to a first and second radio to determine whether an entity or object associated with a proximity beacon service is in proximity. The specification discusses numerous advantages of the claimed approach, as explained and reproduced above. Applicant's claims therefore entail an unconventional technological solution to a technological problem. Accordingly, Applicant's claims are eligible for patenting under Step 2B.

The rejection under 35 U.S.C. 101 should be withdrawn in its entirety.

Claim Rejections – 35 USC 112(pre-AIA) – First Paragraph

Regarding claim 4, and as explained in the Applicant's prior submission, the specification clearly provides that, in some embodiments, the identifiers will be changed over time. As one example, support for claim 4's recitation of changing MAC addresses is found in the application at page 7, lines 3-6. There it is explained that *"....the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device."*

In one example implementation using a Bluetooth local link, at paragraph (page 15, lines 23-24 of the application as filed), "the BD ADDR or MAC address of the Bluetooth device can be used as the identifier".

The specification therefore describes an embodiment where the BR ADRR or the MAC address can be changed, and that it can be used as the identifier in certain Bluetooth embodiments.

Claim 4 has also been amended to properly recite this feature as one or more processors that execute program code to perform steps including:

> "receiving, by the second radio, a second MAC address and a second unique identifier at a second time, the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier; and
>
> associating the first and second unique identifier and the first and second MAC address with a single beacon transmitter device".

Claim 18 has been cancelled.

Claim Rejections – 35 USC 112(pre-AIA) – Second Paragraph

The claim formats adopted by the Applicant are expressly permitted and encouraged by both the courts and the Patent Office.

The legal test for definiteness under 35 USC 112, second paragraph is actually whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed Cir. 1986) (citations omitted).

The claims in question, certainly as now amended, also each recite a logical and operative device (in the case of apparatus claim 1) and a logical and operative method (in the case of claims 31 and 43) that are understood by one of skill in the art.

In addition, the Office Action provides no explanation for why the format adopted for claim 1 – a processor programmed to perform a series of steps - is not a proper form. For a claim in such as format has repeatedly been recognized by both the Court and the Patent Office itself.

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of information in the intended computer system, established a functional relationship such that the claimed attribute data objects were given patentable weight. See *In re Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp.*, 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Texas Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), (finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite). See *MasterMine*, slip op. at 14.

Claim 31 and the claims that depend from it are method claims. Lacking any other specific identification or reason in the Office Action, these method claims must be presumed to not be in improper form.

Nonetheless:

Claim 2 is merely further defining the type of MAC address received.
Claim 4 has been amended to remove the "occasionally change" language.
Claims 5 and 6 are cancelled.
Claim 15 is amended to remove the "occasionally change" language.

Claim 17 is amended to recite "receiving a first unique identifier at a first time that is different from a second unique identifier received at a second time."

Claim 18 is cancelled.

Claim 23 is cancelled.

Claim 13 is amended to positively recite the "sending" and "downloading" steps in sequence.

Claim 14 is cancelled.

Claim 15 is amended to depend from claim 4, and now positively recites the "determining" there is a match, and then "allowing further communications".

Claim 23 is cancelled.

Claims 32 and 34 are cancelled.

Claim Rejections – 35 USC 103

Previously presented claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

Other claims were also rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) in combination with other references such as Sugiyama et al (US 2006/0032901) or Landau (US 2005/0099291) or Sorenson et al (US 2003/0053484) or Brackett et al (US 2005/0114654).

Reconsideration and withdrawal of this rejection is respectfully requested, especially in view of the amendments above.

(A) Sundar and Park Cannot be Combined; or at least There Would be No Motivation to Combine them as they are Intended for Different Purposes

Sundar teaches downloading "SSID"s to a mobile device, in order to qualify if the detected wireless access point will allow for authentication of the mobile device to the WiFi voice network using that access point.

The Office Action considers this feature of Sundar as being the same thing as the Applicant's claimed "downloading identifier related information", and "detecting the proximity of one or more beacon devices associated with the proximity beacon service." The Office Action then points to Park as teaching each proximity beacon transmission may include a MAC address and a unique identifier (referencing Park at Pars 18, 21, 23, 41, 43, Par 66 of office action) and concludes it would have been obvious to one of ordinary skill in the art to combine Park and Sundar "in order to obtain greater security."

Applicant must respectfully disagree because (A) there would be no motivation to combine Sundar and Park and (B) even if their teachings could be combined, one would not arrive at all of the features recited in the claims.

First, there is no indication in either Park or Sunder that such a combination would provide any benefit to security, how that security might be achieved, or to what aspect that security addresses.

Second, Sundar's system is for use BEFORE a connection of a terminal to an 802.11 access point, while Park's system is for use AFTER a connection to a WiFi access point has been made. The infrastructure mode beacons of Sundar and 802.11 in general are for use by terminals to discover the presence of the Wi-Fi network prior to connecting to that network. This is why Sundar teaches downloading SSIDs to qualify if a mobile device should attempt connecting in order to be able to access Voice Over IP (voip) services. However, Park's system (cited by the examiner at Pars18, 21, 23, 41 and 43 and relating

to Fig. 3), is for use in establishing a fall back, "ad-hoc", mode of communication once a 802.11/Wi-Fi network has already been joined. (See Park at Par. 42 *"controller 120 generates an auto-switch request packet packetized with the Ad-Hoc information and transmits the auto-switch request packet to the corresponding terminal* *while terminals are communicating with each other through an access point based on the infrastructure communication mode"*). The ad-hoc information in the form of a "auto-switch request" (Park Fig, 3, and Par. 43) is sent (using the infrastructure mode) but related to establishing an 802.11 (WiFi) ***Ad-Hoc*** mode as a fall back, direct communication approach if the link to the AP (an intermediary between the two devices – see Park Par 42) fails.

Park thus teaches away from the combination of the beacons of Sundar and the auto-switch request packets at least because:

a) the terminals of Park are ***already connected*** to the access point (and have already used the beacons of Sundar), when any auto-switch request packet of Park could be sent,

b) The "auto switch request" packet contains the "address" of the "corresponding terminal" of Park ("*Referring to FIG. 3, the auto-switch request packet 300 includes Ad-Hoc information such as the MAC address of a transmitting terminal 310,* ***the MAC address of a receiving terminal 320, that is, the MAC address of a corresponding terminal,*** *a SSID 330, a BSSID 340, and a signal channel number 350." Park Par. 43*).

The purpose of beacons in Sundar (and 802.11 / Wi-Fi in general) is to broadcast the presence of the Wi-Fi access point's communication services prior to the connection to that AP by a terminal. Therefore combining a "directed" transmission (used after connecting to the AP, and containing the address of the corresponding terminal on that network) with a beacon used for discovering the presence of the network, prior to connecting to it would not be possible, or logical. Indeed, the format of the

infrastructure mode beacons of Sundar are set by the 802.11 standard, and cannot be modified and remain compatible with the 802.11 standard which is used by both Sundar and Park. Simply put, the auto-switch packet of Park is not a beacon, has an incompatible format, and is addressed to a specific recipient (unlike the beacons of Sundar).

Third, the goals of Sundar and Park are completely different, and do not address the same problems. Sundar looks to determine if the "SSID" or "network name" of the communication network is one in which a device can gain access to voice services successfully in place of a cellular connection for voice services. The primary goal is to not waste a device's resources attempting to access a WiFi network which cannot provide access to the voice systems. Park, on the other hand, is directed to creating a direct ad-hoc connection between two terminals, if the intervening access point malfunctions. This is done by sending the "auto switch packet" from one terminal directly to the other to bypass the access point altogether, as discussed above. These are disjoint goals.

Fourth, the use of downloaded SSIDs from the servers of Sundar to a mobile device would not help the two terminals achieve the establishment of an alternate direct communication link between them, and provides no benefit to security or either of the goals of Sundar or Park. This is because all of the information relating to the establishment of the ad-hoc direct communication link by one terminal used to send the "auto switch packet" to the other is already known to both terminals PRIOR to the need to send the cited ad-hoc packet (see Park at Pars. 41 and 43). This is because, as discussed above, Park is used after the SSID of a Wi-Fi network has already been used to connect with a particular network (and after any benefit is Sundar). Therefore there would be no benefit to this combination in either of the objectives of Park or Sundar, or in the third objective of "security", not mentioned by either Park or Sundar.

(B) Even the Combination of Sundar and Park does not Teach or Suggest All of the Elements of the Applicant's Claims

The new limitations of the independent claims below provide further distinctions over Park and Sundar. For example, claim 1 now recites the following (among other features):

> receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers; receiving, using the second radio, a plurality of short range transmissions….[and a processor executing code for]
>
> determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) includes the proximity beacon service identifier (PBSI) and c) if the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:
>
> determining if an entity or object associated with the proximity beacon service is in proximity to the mobile wireless device, by utilizing the identifier related information and the unique identifier.

In other words, in the Applicant's invention as now claimed, the first radio receives identifier related information which is used in determining the proximity of an entity or object associated with a proximity beacon service. The claimed invention also receives short range transmissions, via a second radio, that include a MAC address and a PBSI, and a unique identifier. The Applicant's claim 1 then checks that a MAC address and a PBSI is present and *to see if it is of particular format* – that is, "*if the PBSI … is a proximity beacon transmission associated with the proximity beacon service*". Only then, after completing these three "determining steps" does the Applicant's claim 1 go on to perform a fourth determining step – to determine if an entity or object is in proximity, by using the identifier related information and the unique identifier.

Nowhere does Sundar or Park disclose or suggest determining if an identifier is of a particular format that is, anything like the Applicant's claimed determining "if the PBSI … is a proximity beacon transmission associated with the proximity beacon service".

Additionally, nowhere does Sundar or Park contemplate the advantage of using both identifier related information and a unique identifier to determine when an object (or entity) is in proximity.

As mentioned above, Sundar does use an SSID to identify the Access Points that belong to a voice network for which the mobile devices would be able to gain access, authenticate and receive VoIP services – namely so that the mobile device can match the SSID against a list of SSIDs for networks that can deliver the desired voice service. Sundar also does send an SSID in a "beacon frame", as required in standard WiFi transmissions. Sundar does also have two radios, both a cellular radio and a WiFi radio. However the cellular radio in Sundar is not being used to communicate identifier related information which can be used with a received "unique identifier" to determine if an entity or object is within proximity to the mobile device. Park does not cure this deficiency.

Therefore these limitations recited in claim 1 (and the same or analogous limitations in all other claims) are not found in Sundar and Park, even if those references could be combined (which they cannot be, as discussed), and one was motivated to do so (which they would not).

Claims 1, 6-10, 12-14, and 19 depend from claim 1 and thus include all limitations of claim 1. These claims are thus allowable for the same reasons.

Method claim 31, and its dependent claims 35 and 41-42 recite analogous limitations. These claims are thus allowable for the same reasons.

Claim 4, as now amended, furthermore requires "the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier". The Office Action rejected claim 4 based upon Sundar in view of

Park in further view of Sugiiyama. But Sugiiyama is related to RFID devices, *which do not include MAC addresses*. The is no mention of a MAC address in the cited paragraphs. Furthermore, the proposed combination of a WiFi access point (Sundar) with an ad-hoc mode terminal (as in Park) and using an RFID protocol is not interoperable in any straight forward way. One would not be motivated to combine these diverse wireless systems, as they are from different field of endeavors, address dissimilar problems, and use incompatible protocols.

Regarding claims, such as claim 13, neither Park or Sundar teach sending a detected identifier to a server and receiving something in response.

New independent claim 43 contains analogous limitations as claims 1 and 31 and is therefore allowable for the same reasons stated above.

New claims 44-60 depends from an allowable based claim 1, 31 or 43.

Conclusion

With entry of the foregoing amendments, all of the claims presented should be in condition for allowance.

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Respectfully submitted,

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Electronic Acknowledgement Receipt

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International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20190128_111054-0001U4C7_Response_Final.pdf	244131 a7978f917428b4314e70ac90655178a51c9b96eb	yes	30

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	12
	Applicant Arguments/Remarks Made in an Amendment	13	30
Warnings:			
Information:			
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CLAIM LANGUAGE	SUPPORT IN US2017/0011425A1 AS PUBLISHED
44. (New) The method of Claim 31, further comprising preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission. 46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise: preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.	[0047] **[..] If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server.** This function may instead be omitted and all identifiers passed to the server **100**. **The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.** [..] [0049] [..] In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and **the action function 303 would work to reduce frequency of re-requests to the server.** FIG. 7 describes an example of how to use this ...
47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise: controlling further communications between the mobile	Fig. 3, step 303, Fig. 7, Step 707/708 Fig. 9, step 908 [0043] More particularly, a given device **106**, **108** uses a short range wireless link **107** such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device **108**, **and uses the wide area wireless network connections 103, 104 such as**

device and at least one device or server associated with an entity or object in proximity to the mobile device.	**IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100, and to perform the actual substantive communications between the wireless devices 106 and 108. Device 108 typically uses the short range wireless link 107 and wide area wireless link 103 in a similar manner to locate and initiate communicate with device 106.** [0054] There can also be policy based permissions associated with each account and applied to any information associated with that account. The stored policy permissions can be used to determine what information and under which situations information may be disclosed to another device or user associated with another account. For example, the entity (person in this case) associated with device **202** may have set a policy in their account to not receive any unsolicited information from a broadcast device so as to not be disturbed. However, the person associated with **202** may see the broadcast device and a sign stating a discount is available, and provide input to their device to request any broadcast information on a one time exception basis. The messaging associated with an example mobile and broadcast device process will be described in more detail to follow associated with FIG. 9. See also [0058], [0061] "Chat Example", [0062] "E-Commerce Example", and Fig. 8A and 8B.
48. (New) The method of Claim 31, further comprising: receiving, using the first radio, access code information by the mobile device from at least one of the servers; and utilizing the access code information to gain access to the entity or object determined to be in proximity to the mobile device.	[0068] The present invention can be extended to facilitate other types of transactions as well. … **The Consumer device and/or Merchant device would send a message to an application running on the Server requesting that a person associated with an account for the Consumer be granted access to a specific vehicle (e.g., an "object") that is in the vicinity of and associated with the Merchant device. A set of confirmatory messages (such as to exchange access codes,** to confirm the location of the vehicle, the per-use fee due, and payment for the same, etc.), are then typically also exchanged between the Consumer and the Merchant device with the assistance of the Server and the long range wireless network. **Upon confirmation of the necessary transaction information, the Server sends a message to the Merchant device to unlock the vehicle requested (which may be sent over the second long range wireless network or a yet another network, such as a satellite network).**

50. (New) The method of Claim 31, additionally comprising: sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device. 51. (New) The method of Claim 50, wherein the further information relates to one or more of the following: a loyalty program; a payment service; or a coupon relating to an entity in proximity to the mobile device; or advertising content.	Fig. 3 [0046] An example of an application using this infrastructure follows. The device **204** will simply broadcast an identifier, with no WWAN connection but may **facilitate advertising or local information**. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, the patron's device **202** will receive an identifier sent from museum broadcast device **204** operated by the museum. The patron device **202** passes the identifier or museum device **204** to the central server **100**, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's device **202**. A distinguishing feature of this approach relative to prior art is that the patron device **202** in this example may move out of proximity of broadcast device **204**, yet continue to view the content being provided by the server **100** related to the detected broadcast device **204**. Content may include text, pictures, web pages, application software such as games, informative display applications, or other content such as audio or video to be offered to the user's device as well. Other examples might include **electronic coupons (such as in a grocery store), menus or special offers in a restaurant.** [0067] Finally, the transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. **This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.** [0071]

	As previously mentioned, several key distinctions of this embodiment include that the user of device **902** may walk away out of range form the broadcast device **903** and continue to receive the content using their cellular link, or may choose to play the content at a later time having stored the detected like in a favorites list. Additionally, **the content stored in the account associated with the broadcast device 2 (903) is relevant to the placement of the device and the products near it.** Further, as the content is stored in the server **901** rather than in the broadcast device **903**, the content may be updated, modified, or deleted at anytime. For example the server **901** knowing that the consumer has never been detected previously, **may customize the electronic coupon** to provide a deeper discount than a regularly detected consumer. In the case where the devices are used for electronic commerce as in FIG. 8, **knowledge of the user's past purchases may be used to induce the consumer to try a new product.** Alternatively if the consumer is a regular purchaser a **loyalty program** may provide a **coupon** upon a particular number of repeated purchases. [0017] A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as **advertising or other content customized to the recipient** based on additional information such as known **personal purchasing history**, or interests. [0046] Other examples might include **electronic coupons (such as in a grocery store), menus or special offers in a restaurant.**

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device for use in purchasing items, and further comprising: allowing for the user take delivery at or near the location of a fixed proximity beacon device.	Fig. 8A, Step 821 "list of products to be purchased" [0085] **The content may indicate that the venue has a product delivery service. The user may then press an indication on their device that they would like to see a menu or list of items for sale from the merchant(s) in the venue.** The application on the user's device would then allow them to **see a menu**, for instance, and **select items to purchase**. The user then would be asked to confirm the purchase. **The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. …** Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. [0111] "5. In still further embodiments, a good or service delivery model utilizing the above described broadcast device**, is placed in a known location**, and further .. " .. f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items, which can be implemented in java code, xml, simple text, or other for example optionally including active code elements; g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items; h. A user providing selection of one or more of the items, and **confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device**; Fig. 8B at 830, 834

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device. 54. (New) The method of Claim 53, wherein the application is a multiuser game.	[0074] It is contemplated that the permissions not be an "all or nothing" decision, but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and cart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, **but with other classes services available such as multi-player games** being treated differently. Additionally multiple contacts may be included in the account, each given customized permissions. An example can be that any user may be notified of an anonymous user or other information based on additional policies. [0047] FIG. 3 is a block diagram with further detail of this operation. A device **106**, **108**, or **202** after performing a search (FIG. 3, step **301**) for identifiers on the WPAN or WLAN, will subsequently use the WWAN link to communicate with the central server **100**. If the device does not find identifiers **302** it will either continue to search, or search at a later time **301**. **If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server**. This function may instead be omitted and all identifiers passed to the server **100**. **The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.** In step **304**, if no identifiers require server information, searching is continued in step **301**. [0111] "A central serving capability is provided to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server where .. "this identity is related to certain information and preferences of an account holder **associated with an application** operating on the second wireless device; "the application is operating on both wireless devices;"

	"the application operating on the first device also provides its own identifying information to the central server as well as detected identifiers from devices with applications on them" "The central server contains **account information registered to the applications running on each wireless device**;"
56. (New) The method of Claim 31, wherein the step of determining that an entity or object is within proximity further comprises: comparing the identifier related information with the unique identifier or information derived from the unique identifier. 58. (New) The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform the operations for determining that an entity or object is within proximity by further: comparing the identifier related information with the unique identifier or information derived from the unique identifier.	[0049] [..] As an example of the overall process, a **detected identifier may be relevant to the receiving device** if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. **If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination**. [..] [0064] **The server than generates a message 825 to Device 2 (803) indicating that EII is relevant**, and the transaction participant is present [0065] **The server performs this confirmation in step 824 may matching the device 1 identifier DI1 with the information stored in the account associated with Entity 1 (EI1)** also referred to as the Consumer.

57. (New) The method of Claim 31, additionally comprising: sending the unique identifier, using the first radio, to at least one server of the one or more servers, and wherein the one or more servers perform the following steps: associating an object or entity as being within proximity to the mobile device; storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior; retrieving a stored user email address associated with an account associated with the mobile device; and sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.	[0017] "A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as **advertising or other content customized to the recipient** based on additional information such as known **personal purchasing history**, or interests." [0067] Finally, the **transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits** of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various **specials delivered via email**, or during their next visit via their device in the form of an electronic coupon. This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

Electronic Acknowledgement Receipt

EFS ID:	34988632
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
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Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	20190129_111054-0001U4C7_TPO_Suppl_Response_Transmittal.pdf	71357 adfb89a98d1a337a03da68c66c1c3eec6f3617d6	no	1

Warnings:

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2	Supplemental Response or Supplemental Amendment	20190129_111054-0001U4C7_TPO_Exhibit_A.pdf	123382 a73d7f4efa81d36206c2cff53818fe15a84bcf22	no	8
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New International Application Filed with the USPTO as a Receiving Office

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

SUPPLEMENTAL RESPONSE TO OFFICE ACTION

Enclosed herewith is a copy of Exhibit A that was inadvertently omitted from the response filed January 28, 2019.

January 29, 2018

Respectfully submitted,

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(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

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	1	6868079		2005-03-15	Hunt et al.	
	2	7167487		2007-01-23	Herrmann et al.	
	3	6993049		2006-01-31	Davies et al.	
	4	7020106		2006-03-28	Barnard et al.	
	5	7942337		2011-05-17	Jain et al.	
	6	7174031		2007-02-06	Rhoads et al.	
	7	7886962		2011-02-15	Vawter et al.	
	8	7436831		2008-10-14	Miller et al.	

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	Attorney Docket Number	111054-0001U4C7

	9	7142527		2006-11-28	Garcia-Luna-Aceves	
	10	6791997		2004-09-14	Beyer et. al.	
	11	6788702		2004-09-07	Garcia-Luna-Aceves	
	12	6553006		2003-04-22	KALLIOKULJU et. al.	
	13	6970850		2005-11-29	Freeny et. al.	
	14	7016336		2006-03-21	Sorensen et. al.	
	15	7774231		2010-08-10	Pond et. al.	
	16	5987011		1999-11-16	Toh et. al.	
	17	6909721		2005-06-21	Ekberg et. al.	
	18	7158756		2007-01-02	Palin et. al.	
	19	7177594		2007-02-13	Burr et. al.	

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	20	7181521		2007-02-20	Knauerhase et. al	
	21	7197326		2007-03-27	Acampora et. al.	
	22	7200132		2007-04-03	Twitchell et al.	
	23	7209468		2007-04-24	Twitchell et al.	
	24	7221668		2007-05-22	Twitchell et al.	
	25	7302256		2007-11-27	O'Hara et. al.	
	26	7313120		2007-12-25	Ekberg et. al.	
	27	7322043		2008-01-22	Letsinger et. al.	
	28	7324824		2008-01-29	Smith et. al.	
	29	7327701		2008-02-05	Fong et al.	
	30	7339909		2008-03-04	Kotzin et. al.	

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	31	7342876		2008-03-11	Bellur et. al.	
	32	7343564		2008-03-11	Othmer et. al.	
	33	7346341		2008-03-18	Costa-Requena et al.	
	34	6615804		2003-09-09	Matthews et al.	

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	1	20090288012	A1	2009-00-19	Hertel et al.	
	2	20110039592	A1	2011-02-17	Haddad et al.	
	3	20100284447	A1	2010-11-11	Gore et al	
	4	20100250673	A1	2010-09-30	Laroia et al.	
	5	20070286111	A1	2007-12-13	Corson et al.	

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	6	20080188261	A1	2008-08-07	Arnone et al.	
	7	20010003191	A1	2009-04-07	Kovacs et al.	
	8	20020061009	A1	2006-03-21	Sorensen et al.	
	9	20020188656	A1	2002-12-12	Patton et al.	
	10	20080132252	A1	2008-06-05	Altman et al.	
	11	20080114834	A1	2008-05-15	Miyazaki et al.	
	12	20080104227	A1	2008-05-01	Birnie et al.	
	13	20080102856	A1	2008-05-01	Fortescue	
	14	20080080397	A1	2008-04-03	Richardson et al.	
	15	20080071874	A1	2008-03-20	Roodman et al.	
	16	20080070593	A1	2008-03-20	Altman et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	17	20080056215	A1	2008-03-06	KOPIKARE et al.	
	18	20080052109	A1	2008-02-28	Boys et al.	
	19	20080051033	A1	2008-02-28	Hymes et. al	
	20	20080036653	A1	2008-02-14	Huston et. al.	
	21	20070244633	A1	2007-10-18	Phillips et al.	
	22	20070237321	A1	2007-10-11	Bloebaum et. al.	
	23	20070233367	A1	2007-10-04	Chen et. al.	
	24	20070190494	A1	2007-08-16	Rosenberg et. al.	
	25	20070179792	A1	2007-08-02	Kramer et. al.	
	26	20070161382	A1	2007-07-12	Melinger et. al.	
	27	20070143348	A1	2007-06-21	Rosenberg et. al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	28	20070117576	A1	2007-05-24	Huston et. al.	
	29	20070061487	A1	2007-03-15	Moore et. al.	
	30	20070030824	A1	2007-02-08	Ribaudo et. al.	
	31	20060234631	A1	2006-10-19	Dieguez et. al.	
	32	20060229058	A1	2006-10-12	Rosenberg et. al.	
	33	20060089876	A1	2006-04-27	Boys et. al.	
	34	20050086211	A1	2005-04-21	Mayer et. al.	
	35	20050038876	A1	2005-02-17	Chaudhuri et. al.	
	36	20080255947	A1	2008-10-16	Friedman et. al.	
	37	20080249928	A1	2008-10-09	Hill et. al.	
	38	20080167988	A1	2008-07-10	Sun et. al.	

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	39	20050156026	A1	2005-07-21	Ghosh et. al.	
	40	20050187873	A1	2005-08-25	Labrou et. al.	
	41	20040019564	A1	2004-01-29	Goldthwaite et. al.	
	42	20020123965	A1	2002-09-05	Phillips et. al.	
	43	20060069922	A1	2006-03-30	Jelinek et. al.	
	44	20080134052	A1	2008-06-05	Davis et. al.	
	45	20080182591	A1	2008-07-31	Krikorian et. al.	
	46	20080222711	A1	2008-09-11	Michaelis et. al.	
	47	20080176583	A1	2008-07-24	BRACHET et. al.	
	48	20080139217	A1	2008-06-12	Alizadeh-Shabdiz et. al.	
	49	20080132170	A1	2008-06-05	Alizadeh-Shabdiz et. al.	

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	Attorney Docket Number	111054-0001U4C7

	50	20080008121	A1	2008-01-10	Alizadeh-Shabdiz et. al.	
	51	20080008120	A1	2008-01-10	Alizadeh-Shabdiz et. al.	
	52	20080008119	A1	2008-01-10	Alizadeh-Shabdiz et. al.	
	53	20080008118	A1	2008-01-10	Alizadeh-Shabdiz et. al.	
	54	20080008117	A1	2008-01-10	Alizadeh-Shabdiz et. al.	
	55	20070004428	A1	2007-01-04	Morgan et al.	
	56	20070004427	A1	2007-01-04	Morgan et al.	
	57	20060240840	A1	2006-10-26	Morgan et al.	
	58	20060217131	A1	2006-09-28	Alizadeh-Shabdiz et. al.	
	59	20060200843	A1	2006-09-07	Morgan et al.	
	60	20060106850	A1	2006-05-18	Morgan et al.	

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	61	20060095349	A1	2006-05-04	Morgan et al.	
	62	20060095348	A1	2006-05-04	Jones et al.	

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	1	Wang, et al., "Peer2Me - Rapid Application Framework for Mobile Peer-to-Peer Applications", Department of Computer and Information Science	
	2	Golle et al. "Universal re-encryption for mixnets". In: Topics in Cryptology–CT-RSA 2004. Springer, 2004, pp. 163–178	
	3	U.S. Provisional Application No. 61/054,162 filed on May 18, 2008 by Mark Braverman for System And Method For Electronic Payment	
	4	"Simple Pairing Whitepaper", Bluetooth Special Interest Group, V10r00, (2006)	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	5	Mettala, R., "Bluetooth Protocol Architecture", Bluetooth White Paper, Document No. 1.C.120/1.0, 3-20 (1999)
	6	Duflot, et al., "A Formal Analysis of Bluetooth Device Discovery", School of Computer Science, University of Birmingham, 1-16
	7	Wg, Hid, "Device Identification Specification", V12r00, 1-20 (2006) NEED PUBLICATION DETAILS
	8	U.S. Provisional Application No. 61/122,240 filed on December 12, 2008 by Rajiv Patel for System And Method For Electronic Payment
	9	Bluetooth White Paper 1.1, AU-System, 1-25 (2000)
	10	Brakman et al., "Formal model of the Bluetooth Inquiry Protocol", 1-13 (2006)
	11	Weis et al. "Security and privacy aspects of low-cost radio frequency identification systems". In: Security in pervasive computing. Springer, 201–212 (2004)

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(Not for submission under 37 CFR 1.99)

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Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2019-02-27
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

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Application Number:	15271410
Filing Date:	21-Sep-2016
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	David J. Thibodeau/Elisabeth Smith
Attorney Docket Number:	111054-0001U4C7

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Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	120	120
		Total in USD ($)		**120**

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EFS ID:	35288058
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	28-FEB-2019
Filing Date:	21-SEP-2016
Time Stamp:	16:03:31
Application Type:	Utility under 35 USC 111(a)

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6	Non Patent Literature	SimplePairing_WP_V10r00.pdf	4769813 d50e5fea6042bdcfdee33e870b208efbe44aaa46	no	23
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7	Non Patent Literature	Wang-Peer2Me.pdf	860502 b04d39f7d28b28c321fca05834743f97cf587569	no	10
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8	Non Patent Literature	Bluetooth_Whitepaper_AU_System.pdf	400196 331875bc575d14d01c8e5092394b2f5f22fe9723	no	26
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9	Non Patent Literature	Wg_Device_Identification_Specification.pdf	173135 d24739740373f73b812e158823cbb3f2cc1f2eac	no	20
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10	Non Patent Literature	Mettala_Bluetooth_Protocol_Architecture.pdf	349215 2c4932575f40187ad726ca1515cac2bc5edbaba1	no	20
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11	Information Disclosure Statement (IDS) Form (SB08)	20190228_111054-0001U4C7_TPO_IDS_1.pdf	1037656 f49caf0f599e60c0079d666835db8bb3766b13bf	no	13
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12	Non Patent Literature	Weis.pdf	627103 fbae476785252e230dd4b70203428c23f31d88a0	no	12
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6901270	B1	2005-05-31	Beach	
	2	7039358	B1	2006-05-02	Shellhammer et al.	
	3	6580700	B1	2003-06-17	Pinard et al.	
	4	7039027	B2	2006-05-02	Bridgelall	
	5	6990587	B2	2006-01-24	Willins et al.	
	6	6587034	B1	2003-07-01	Heiman et al.	
	7	6067297	B1	2000-05-23	Beach	
	8	6188681	B1	2001-02-13	Vesuna	

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	9	7773995	B2	2010-08-10	Rappaport et al.	
	10	6909399	B1	2005-06-21	Zegelin et al.	
	11	7412246	B2	2008-08-12	Lewis et al.	
	12	7826425	B2	2010-11-02	Sekhar	
	13	6259898	B1	2001-07-10	Lewis	
	14	7030761	B2	2006-04-18	Bridgelall	
	15	7126926	B1	2006-10-24	Bjorklund et al.	
	16	7173922	B2	2007-02-06	Beach	
	17	6712274	B2	2004-03-30	Dvorkis et al.	
	18	6002918	A	1999-12-14	Heiman et al.	
	19	5815811	A	1998-09-29	Pinard et al.	

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	20	6715681	B2	2004-04-06	Dvorkis	
	21	7173923	B2	2007-02-06	Beach	
	22	7492254	B2	2009-02-17	Bandy et al.	
	23	6616049	B1	2003-09-09	Barkan et al.	
	24	7403120	B2	2008-07-22	Duron et al.	
	25	7280836	B2	2007-10-09	Fuccello et al.	
	26	8204039	B2	2012-06-19	Beach et al.	
	27	7440781	B2	2008-10-28	Beach et al.	
	28	6845338	B1	2005-01-18	Willins	
	29	7822000	B2	2010-10-26	Sekhar	
	30	6236674	B1	2001-05-22	Morelli et al.	

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	31	7030812	B2	2006-04-18	Bekritsky et al.	
	32	7005968	B1	2006-02-28	Bridgelall	
	33	7729326	B2	2010-06-01	Sekhar	

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	1	20080119136	A1	2008-05-22	Khazi	
	2	20050266868	A1	2005-12-01	Fuccello	
	3	20050243781	A1	2005-11-03	Vesuna	
	4	20080025282	A1	2008-01-31	Hong	
	5	20080002641	A1	2008-01-03	Hong et al.	
	6	20070281634	A1	2007-12-06	Rao et al.	

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	7	20060264212	A1	2006-11-23	Sekhar	
	8	20070025287	A1	2007-02-01	Goren et al.	
	9	20060141932	A1	2006-06-29	Lawrence et al.	
	10	20050180367	A1	2006-07-13	Dooley et al.	
	11	20060153085	A1	2006-07-13	Willins et al.	
	12	20040264404	A1	2004-12-30	Zegelin	
	13	20050213553	A1	2005-09-29	Wang	
	14	20070002833	A1	2007-01-04	Bajic	
	15	20060245373	A1	2006-11-02	Bajic	
	16	20060245404	A1	2006-11-02	Bajic	
	17	20060245393	A1	2006-11-02	Bajic	

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	18	20060268765	A1	2006-11-30	Bajic et al.	
	19	20060268834	A1	2006-11-30	Bajic	
	20	20070204158	A1	2007-08-30	Hatashita et al.	
	21	20080136621	A1	2008-06-12	Malik et al	
	22	20060022038	A1	2006-02-02	Hewlin et al.	
	23	20060116160	A1	2006-06-01	Fuccello	
	24	20050124359	A1	2005-06-09	Willins et al.	
	25	20040076136	A1	2004-04-22	Beach	
	26	20060171341	A1	2006-08-03	Wang et al.	
	27	20070015549	A1	2007-01-18	Hernandez et al.	
	28	20050243737	A1	2005-11-03	Dooley et al.	

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	29	20050054350	A1	2005-03-10	Zegelin	
	30	20060125631	A1	2006-06-15	Sharony	
	31	20060114104	A1	2006-06-01	Scaramozzino	
	32	20070026818	A1	2007-02-01	Willins et al.	
	33	20070173248	A1	2007-07-26	Sekhar	
	34	20070091859	A1	2007-04-26	Sethi et al.	
	35	20060029024	A1	2006-02-09	Zeng et al.	
	36	20070010278	A1	2007-01-11	D'Agostino et al.	
	37	20060193258	A1	2006-08-31	Ballai	
	38	20050113090	A1	2005-05-26	Sharony	
	39	20070081503	A1	2007-04-12	Mower	

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	40	20070178907	A1	2007-08-02	Gopalan et al.	
	41	20070049297	A1	2007-03-01	Gopalan et al.	
	42	20070133453	A1	2007-06-14	Sethi et al.	
	43	20060111045	A1	2006-05-25	Orlassino et al.	
	44	20080009307	A1	2008-01-10	Sekhar et al.	
	45	20070060105	A1	2007-03-15	Batta	
	46	20070230441	A1	2007-10-04	Sethi et al.	
	47	20060045042	A1	2006-03-02	Sethi et al.	
	48	20060270412	A1	2006-11-30	Willins et al.	
	49	20070211727	A1	2007-09-13	Sethi et al.	
	50	20030100328	A1	2003-05-29	Klein et al.	

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	51	20050136891	A1	2005-06-23	Wang et al.	
	52	20050185615	A1	2005-08-25	Zegelin	
	53	20030021250	A1	2003-01-30	Willins et al.	

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	1	101233722	CN	A	2008-07-30	Sekhar		
	2	1098477	EP	B1	2009-12-23	Hughes et al.		
	3	1207654	EP	A2	2002-05-22	Beach et al.		
	4	2752347	FR	A1	1998-02-13	Swift et al.		
	5	2003152739	JP	A	2003-05-23	Beach et al.		
	6	2564287	CA	C	2010-08-24	Heiman et al.		

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	7	2218268	CA	C	2007-01-16	Heiman et al.		
	8	2506121	CA	C	2010-09-21	Pinard et al.		
	9	2798749	FR	A1	2001-03-23	Klein et al.		
	10	2007047181	WO	A2	2007-04-26	Bolluck et al.		
	11	1908235	EP	B1	2018-01-24	Meyer		
	12	101036061	CN	A	2007-09-12	Ha et al.		
	13	1296155	EP	A1	2003-03-26	Goren et al.		
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

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SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2019-02-25
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

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Patents

Mobile unit algorithms for use in a cellular local area wireless network

Abstract

A communication network comprising a cellular local area wireless network includes a plurality of access points connected to a housed computer and each other, and a plurality of mobile units each mobile unit being arranged for association with an access point. The mobile units are arranged to periodically scan for and identify the most eligible access point for association on the basis of the criteria of best quality signal strength and loading factor. In order to identify when mobile units are being removed from a predetermined area, access points having directional antennae are situated adjacent exit points to detect when mobile units are in a vicinity. Each mobile unit may include paging facilities, including the capability of transmitting information in a coded form known both to the unit and to a host, and power-saving facilities.

Classifications

Y02D70/10 Techniques for reducing energy consumption in wireless communication networks according to the Radio Access Technology [RAT]

View 1 more classifications

CA2218268C

Canada

Find Prior Art Similar

Other languages: French

Inventor: Frederic Heiman, Patrick Pinard, Andrew Warback, Michael Shiba, Robert Beach

Current Assignee : Symbol Technologies LLC

Worldwide applications

1997 CA

Application CA002218268A events

1996-11-08 Priority to US08/747,034

1996-11-08 Priority to US747,034

1997-10-15 Application filed by Symbol Technologies LLC

1997-10-15 Priority claimed from CA2564287A

1998-05-08 Publication of CA2218268A1

2007-01-16 Application granted

2007-01-16 Publication of CA2218268C

2017-10-15 Anticipated expiration

2019-02-24 Application status is Expired - Lifetime

Info: Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (29)

1. An arrangement for maximizing battery life in each of a plurality of portable, battery-powered, mobile units, each of the mobile units being in wireless communication with a plurality of spaced-apart, stationary access points of a communications network, the arrangement comprising:

a) a radio in each of the mobile units, the radio having a transceiver for transmitting data to and from the access points within a predetermined working range in a powered mode of network operation;

b) a processor in each of the mobile units, the processor having a controller operatively connected to the transceiver; and c) a timer in each of the mobile units, for powering the radio only during the powered mode of network operation, and for reducing power to the radio to prevent data transmission by the transceiver during a power-saving mode of operation.

2. In a communications network including a plurality of spaced-apart stationary access points each of the access points being capable of wireless communication with portable, battery-powered, mobile units when within a working range from the access points, an arrangement for maximizing battery life in each of the mobile units, the arrangement comprising:

a) a radio section in each of the mobile units, the radio section having a transceiver for transmitting data to and from the access points in a powered mode of network operation;

b) a processor section in each of the mobile units, the processor section having electronic components including a control processor operatively connected to the transceiver; and c) a timer in each of the mobile units, for powering the radio section only during the powered mode of network operation.

3. The arrangement according to claim 2, wherein the control processor reduces battery power to the processor section in a suspended mode, and wherein the control processor controls the timer to reduce battery power to the transceiver when the processor section is in the suspended mode.

4. The arrangement according to claim 2, wherein the timer is operative for reducing power to the transceiver to prevent the transceiver from transmitting data in a power-saving mode of operation.

5. The arrangement according to claim 4; and further comprising an interface between the radio and processor sections of each of the mobile units, the transceiver of a respective radio section being operation for transmitting control data to and from the control processor via the interface.

6. The arrangement according to claim 5, wherein the network includes a host computer, each of the mobile units desiring access to the host computer being operative for selecting a most eligible access point from among the access points based on the control data received by the transceiver of the respective radio section.

7. The arrangement according to claim 6, wherein the mobile unit desiring access to the host computer transmits a probe message to the access points, receives response messages from the access points, and selects the most eligible access point based on the received response messages; and wherein the timer powers the radio section to the power-saving mode for each mobile unit not associated with an access point.

8. The arrangement according to claim 4, wherein one of the electronic components is a clock for timing the control processor, and wherein the timer is operative for halting the clock in the power-saving mode.

9. The arrangement according to claim 4, wherein each access point repeatedly transmits a broadcast beacon at predetermined intervals, and wherein the control processor controls the timer to power the radio section back to the powered mode upon receipt of the beacon.

10. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of every beacon.

11. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of every other beacon.

12. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of a predetermined number of beacons.

13. The arrangement according to claim 9, wherein the radio section is powered to the powered mode based on the number of transmissions of the data in a given time period.

14. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon elapse of a fixed time interval after receipt of the beacon.

15. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon elapse of a variable time interval after receipt of the beacon.

16. In a communications network including a plurality of spaced-apart stationary access points each of the access points being capable of wireless communication with portable, battery-powered, mobile units when within a working range from the access points, a method maximizing battery life in each of the mobile units, the method comprising the steps of:

a) transmitting data to and from the access points in a powered mode of network operation by providing a transceiver in each of the mobile units;

b) providing a processor section in each of the mobile units, the processor section having electronic components including a control processor, and operatively connecting the control processor to the transceiver; and c) powering the radio section with a timer only during the powered mode of network operation.

17. The method according to claim 16, wherein the control processor reduces battery power to the processor section in a suspended mode, and further comprising the step of controlling the timer to reduce battery power to the transceiver when the processor section is in the suspended mode.

18. The method according to claim 16, wherein the powering step is performed by reducing power to the transceiver to prevent the transceiver from transmitting data in a power-saving mode of operation.

19. The method according to claim 18, and further comprising the step of transmitting control data to and from the control processor via an interface provided between the radio and processor sections of each of the mobile units.

20. The method according to claim 19, wherein the network includes a host computer, each of the mobile units desiring access to the host computer being operative for selecting a most eligible access point from among the access points.

21. The method according to claim 20, wherein the mobile unit desiring access to the host computer transmits a probe message to the access points; and receives response messages from the access points, and selects the most eligible access point based on the received response messages, and further comprising the step of powering the radio section to the power-saving mode for each mobile unit not associated with an access point.

22. The method according to claim 18, wherein one of the electronic components is a clock for timing the control processor, and further comprising the step of halting the clock in the power-saving mode.

23. The method according to claim 18, wherein each access point repeatedly transmits a broadcast beacon at predetermined intervals, and further comprising the step of controlling the timer to power the radio section back to the powered mode upon receipt of the beacon.

24. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of each beacon.

25. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of every other beacon.

26. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of a predetermined number of beacons.

27. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode based on the number of transmissions of the data in a given time period.

28. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon elapse of a fixed time interval after receipt of the beacon.

29. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon elapse of a variable time interval after receipt of the beacon.

Similar Documents

Publication	Publication Date	Title
US4759051A	1988-07-19	Communications system

US6633768B2	2003-10-14	Wireless access point software system
US5815811A	1998-09-29	Preemptive roaming in a cellular local area wireless network
US20040014474A1	2004-01-22	Wireless network connection switching management system and method
EP0655872A2	1995-05-31	Paging message processing
US20030181215A1	2003-09-25	Frequency beacon to broadcast allowed frequency
WO1992002104A1	1992-02-06	Cellular radio
US20030104832A1	2003-06-05	Mobile telephone with receive only mode
US6002918A	1999-12-14	Power-saving arrangement and method for mobile units in communications network
US6119024A	2000-09-12	Mobile radio system
JPH02256331A	1990-10-17	Radio communication system
EP0698976A1	1996-02-28	Wireless local area network system
US6993329B2	2006-01-31	Apparatus and method for automatically switching communication/communication suppression mode of wireless communication terminal
CN1183702A	1998-06-03	Mobile station having enhanced stadby mode
US20070298790A1	2007-12-27	Cellular network acquisition method and apparatus
US6600922B1	2003-07-29	Mobile station with intelligent control of scan time between home band scans when roaming
US20030040312A1	2003-02-27	Cellular telephone equipment and cell search method used therefor
EP0350007A2	1990-01-10	Diversity antenna communication system
US7096018B2	2006-08-22	Group communication system having group number specified by mobile unit to permit intergroup calls
US20030092375A1	2003-05-15	Mobile communication terminal, broadcast information storing method, cell transfer method, and mobile communication system
JPH10117166A	1998-05-06	Mobile body communication system
JPH11259783A	1999-09-24	Emergency relief system
JPH1118130A	1999-01-22	Mobile communication system and mobile station and radio base station for mobile communication system
JPH1098770A	1998-04-14	Detection system for portable information communication equipment
JPH0556472A	1993-03-05	Variable position registration system

Priority And Related Applications

Priority Applications (2)

Application	Priority date	Filing date	Title
US08/747,034	1989-06-29	1996-11-08	Power-saving arrangement and method for mobile units in communications network
US747,034		1996-11-08	

Applications Claiming Priority (1)

Application	Filing date	Title
CA2564287A	1997-10-15	Mobile unit algorithms for use in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2002-07-15	EEER	Examination request	
2017-12-18	MKEX	Expiry	**Effective date:** 20171016

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Patents

Preemptive roaming in a cellular local area wireless network

Abstract

A data communications network including a number of stationary access points and a number of mobile units. Each mobile unit is configured to scan for and select a most eligible access point for association therewith on the basis of received access point signal quality and loading factors at the access point. A physical area is defined within which all mobile units must be kept and access points are provided adjacent the exit point(s) from the physical area.

CA2506121C

Canada

Find Prior Art Similar

Other languages: French

Inventor: Patrick Pinard, Frederic Heiman

Current Assignee : Symbol Technologies LLC

Worldwide applications

1996 CA

Application CA2506121A events

1995-10-27 Priority to US549,051

1995-10-27 Priority to US08/549,051

1996-10-01 Application filed by Symbol Technologies LLC

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2010-09-21 Publication of CA2506121C

2016-10-01 Anticipated expiration

2019-02-24 Application status is Expired - Lifetime

Info: Cited by (2), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (2)

1. A data communications network, comprising:

a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile units using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, d) a physical area within which all mobile units are kept, said area having an exit adjacent which one of the access points is located.

2. A network as claimed in claim 1 in which said one of the access points at the exit includes a directional antenna for transmitting an alarm signal in the vicinity of the exit.

Description

PREEMPTIVE ROAMING IN A CELLULAR LOCAL
AREA WIRELESS NETWORK

This is a division of copending Canadian Patent Application Serial No. 2,186,923 that was filed on October 1, 1996.

BACKGROUND OF THE INVENTION
Field of the invention The invention relates generally to preemptive roaming among cells in a cellular network. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points.

2. Description of the Related Art Wireless local area networks (LAN'S) are used in business applications such as inventory, price verification mark-down, portable point of sale, order entry, shipping, receiving and package tracking. Such systems are often proprietary systems wherein the operator carries a mobile unit such as a hand-held computer communicating with a house computer via one of a plurality of access points connected to the house computer and to one another, each access point interacting with the house computer to create a wireless cell.
In order to achieve inter-operability of the various proprietary systems a draft standard IEEE 802.11 has been proposed (the IEEE 802.11 draft specification is available for public inspection).
The draft standard includes features such as 1Mbps and 2Mbps data rates, carrier sense multiple access/collision avoidance (CSMA/CA), a power-save mode for battery-operated mobile stations, seamless roaming in a full cellular network, high throughput operation, diverse antenna systems designed to eliminate "dead spots", and an easy interface to existing network infrastructures.
The term "roaming" relates to the scanning by each mobile unit of all access points to identify and associate with an eligible access point. Roaming between cells provides great flexibility and is particularly advantageous in locations that are difficult to wire, for simple relocation of work stations, and for portable work stations. The IEEE 802.11 protocols supports either direct-sequence or frequency-hopping spread-spectrum systems, as well as infrared communications. Each access point executes a unique hopping pattern across 79 non-overlapping frequencies at a rate of one hop every 100 milliseconds, 66 hopping patterns being specified in the IEEE 802.11 draft standard and being selected to minimise the possibility of interference.' Frequency hopping spread-spectrum systems are preferred by the majority of users as they allow increased capacity and decreased interference.

Although the IEEE 802.11 draft specification provides the basic packet types which can enable roaming it does not actually set the roaming algorithm.
According to the draft specification the mobile unit determines the access point with which it will associate and the access point must accept the mobile unit unless it is defective or certain alarm conditions exist, such as memory full. There is, however, no suggestion of how, or by what criteria, other than those mentioned above, the mobile unit might select an appropriate access point, or the optimum access point.
US 5,276,680 relates to a communication system including a plurality of portable units and a plurality of controllers wired to a network. Each portable unit polls all of the controllers to establish whether it can associate with any controller and receives a response from any controller having less than a predetermined number of portable units already associated therewith.
SUMMARY OF THE INVENTION
1. Objects of the Invention It is an object of the present invention to provide a communication system allowing improved selection by a mobile unit of an access point for association.
It is a further object of the present invention to provide a communication system allowing selection by a mobile unit of an access point to provide optimum operation of the system.
It is a further object of the present invention to provide a communication system providing information concerning the physical location of a mobile unit.
It is a further object of the present invention to provide a communication system adapted to prevent mobile units from being taken outside a given physical area.
2. Features of the Invention Certain exemplary embodiments can provide a data communications network, comprising: a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile units using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, d) a physical area within which all mobile units are kept, said area having an exit adjacent which one of the access points is located.
Accordingly, a simple and reliable arrangement is provided enabling preemptive roaming and optimum selection of an access point for association with a mobile unit.

Each mobile unit may select a group of eligible access points and select the most eligible access point from that group. The received access point signal quality may be represented by the received signal strength indication (RSSI) . The loading factor may be defined by the number of mobile units associated with a given access point. The cellular communications network may comprise a 1Mbps frequency-hopping spread-spectrum wireless LAN conforming to the IEEE 802.11 draft specification.

4a Each mobile unit may send out a probe message packet to all access points wherein the probe packet has no destination address but a mobile unit specific source address. The probe packet may include an identification of the access point with which the mobile unit is currently associated. Each access point that detects the probe packet may send a probe response packet containing the following information:

5 access point address;
access point frequency hopping pattern;
access point present channel;
time remaining in present channel;
loading factor.
The mobile unit may carry out its selection on the basis of the signal quality of, and information contained in the received probe response packets or the access point signal quality may be determined from a beacon signal sent by the access point independently of a probe response packet.
Each mobile unit may store the RSSI value for each access point and calculate an average value over a predetermined period, and RSSI values outside a predetermined range may be omitted from the averaging calculation.
Each mobile unit may carry out a full scan of all available frequency channels on power-up and thereafter at regular intervals. The full scan may be carried out at approximately thirty second intervals. Each mobile unit may carry out a partial scan of known access points at regular intervals more frequently than a full scan is carried out, for example at approximately five second intervals.
Each mobile unit not associated with an access point may identify on scanning all access points with signal quality equal to or above a threshold value and select for association the access point having the lowest loading factor; when two or more access points have an equal lowest loading factor the access point having the highest RSSI value may be selected. The threshold value may be set at six counts below the highest detected RSSI
value.
A mobile unit associated with an access point and experiencing an unacceptably low communication level may roam excluding the current access point from selection. The unacceptably low communication level may be achieved when more than 50% retries, CRC errors or missed beacons are experienced. The excluded access point may be re-included for selection when its RSSI value has increased by a predetermined limit. If no eligible access points are identified for re-association the mobile unit may continue to associate with the current access point.
A mobile unit associated with an access point and achieving a satisfactory level of communication may make a scanning decision at predetermined intervals. A satisfactory communication level may be achieved when 50%
or less retries, CRC errors or missed beacons are experienced. An eligible group may be selected comprising all access points with signal quality above a predetermined threshold, the group including the current access point when its signal quality is above a further predetermined threshold, and the access point may be selected having the lowest loading factor; access points having a loading factor of more than a given proportion of the current access point loading factor may be excluded and where two or more access points have the same loading factor, the access point having the highest signal quality may be selected. The eligible group threshold value may be six counts below the highest received RSSI value, the current access point further threshold value may be eleven counts below that RSSI

value, and access points having a loading factor of more than 75% of the current access point loading factor may be excluded.
Each mobile unit may carry out a partial scan of known access points at predetermined intervals and may carry out the roaming decision immediately after the partial scan.
The communications network may be included in one of an inventory, price verification, mark-down, portable point of sale, order entry, shipping, receiving and package tracking systems.
According to the invention there is further provided a mobile unit for use in a cellular communications network comprising a plurality of access points, the mobile unit including a communications system for association with an access point and a selection system for scanning all access points, selecting a group of eligible access points for association and selecting from that group a most eligible access point, selection being carried out according to the following criteria:
a received access point signal quality; and loading factor.
According to the invention there is further provided a cellular communications network comprising a plurality of mobile units and a plurality of access points, the mobile unit being arranged to roam and associate with a selected access point, the mobile unit including a selection system for selecting a group of eligible access points for association and selecting from that group the most eligible access point, selection being carried out according to the following criteria:
received access point signal quality; and loading factor.
According to the invention there is further provided a method of operation of a cellular communications network, the network including a plurality of access points in communication with each other and a plurality of mobile units wherein:

each mobile unit scans for and associates with the most eligible access point at predetermined intervals, each mobile unit selecting a group of eligible access points, and from that group, selecting the most eligible access point according to the following criteria:
received access point signal quality; and loading factor.
According to the invention there is yet further provided a data communications network including a plurality of stationary access points and a plurality of mobile units wherein:
each mobile unit scans for and selects as eligible access point for association therewith on the basis of received access point signal quality and loading factor at the access point and wherein:
a physical area is defined within which all mobile units must be kept and access points are provided adjacent the or each exit point from the physical area.
The access point at the exit point may include a directional (horn) antenna providing a strong signal in the vicinity of the exit point.
In accordance with other aspects of the present invention there is provided a data communications network including a plurality of stationary access points operatively connected to a host and a plurality of mobile units, said network comprising: a) each of the mobile units using frequency hopping spread spectrum radio frequency communications, and 8a including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, and c) a selector in each of the mobile units to select a most eligible one of the access points from said probe response packets, and to associate said one of the mobile units with the most eligible one of the access points at predetermined intervals, the most eligible one of the access points being selected according to received signal quality at said one of the mobile units, and a loading factor at each of the stationary access points.
In accordance with another aspect of the present invention there is provided a method of operating a cellular communications network including a plurality of access points in communication with each other and operatively connected to a host, and a plurality of mobile units, comprising the steps of: a) broadcasting a probe packet to all of the access points in a predetermined range from one of the mobile units that is broadcasting the probe packet, each of the mobile units using frequency hopping spread spectrum radio frequency communications; b) detecting the probe packet being broadcast, and responsively sending probe response packets from the access points within said range back to said one of the mobile units; c) minimizing interference among 8b the probe response packets; d) scanning the plurality of the access points at predetermined intervals; and e) selecting a group of eligible ones of the access points from the plurality of the access points, by selecting a most eligible one of the access points from the group according to received signal quality at said one of the mobile units and loading factor.
In accordance with yet another aspect of the present invention there is provided a data communications network, comprising: a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, and d) a physical area within which all the mobile units are kept, said area having an exit adjacent which one of the access points is located.

8c The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in conjunction with the accompanying drawings. It is to be under.stood that the invention may be carried into practice in a number of ways, and the described embodiment is not intended to be limiting.

BRIEF DESCRIPTION OF THE DRAWING(S) Fig. 1 is a schematic illustration showing the communication system of the present invention in operation;
Fig. 2a is a block diagram illustrating the steps carried out by a mobile unit during the roaming process;
Fig. 2b is a flow chart illustrating the steps carried out by a mobile unit for selection of the most eligible access point;
Fig. 3 shows a probe response message typically sent by an access point according to the present invention;
and Fig. 4 is a schematic illustration showing a further embodiment of the communication system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT
Referring to Fig. 1 one application of a cellular wireless communication system is in the field of inventorying. One or more operators 1 each carry a mobile unit 2, such as a portable computer. Information concerning the items 3 to be inventoried is entered into the mobile unit 2, for example by scanning bar code symbols on the items 3. In order to communicate the information obtained to a backbone house computer 4 a plurality of access points 5 are provided each connected to the house computer 4 and one to another, each access point 5 together with the backbone house computer 4 forming a cell. Depending on the location of the operator 1 it is desirable that the mobile unit should select the optimum access point; in addition, if conditions change, for example if the operator 1 changes position, it is desirable that the mobile unit 2 should, if necessary, re-associate with a new access point if the current access point 5 does not allow a satisfactory performance or the new access point offers an improved performance. The mobile unit 2 and access points 5 are arranged for wireless communication at radio frequencies, 5 for example, 2.4GHz in the industrial scientific medical (ISM) band. The steps carried out by a mobile unit 2 which is not currently associated to an access point in selecting an access point are shown in Figs. 2a and 2b.
As shown in the block diagram of Fig. 2a the mobile unit 10 (MU) firstly sends out a probe packet (6) to all access points (AP). The probe packet, contains the mobile unit source address but has no destination address and hence any access point that detects the probe packet must send a response. Accordingly, the probe packet is detected by all access points within range (7) and each of those access points sends out a probe response packet (8) The form of the probe response packet is shown in Fig. 3. The information contained therein includes the access point address, the hopping pattern, the present channel, time left in the present channel, the loading factor

(discussed in more detail below) and any other timing information that may be required. Returning to Fig. 2a the mobile unit associates with the most eligible access point based on the probe response packets that it receives.

Referring to Fig. 2b the mobile unit selects the most eligible access point in the following manner:

As each probe packet response (PPR) is received (10) the signal quality of the response is measured by determining the received signal strength indication (RSSI) (11). For reference, RSSI values generally vary from 25 to 60, with good communications experienced above approximately 35. In practice, rather than relying on a single instantaneous value, the RSSI information for each access point is placed in a table in the memory of the mobile unit and is updated each time a probe response packet is received from that access point. In order to minimise fluctuation the RSSI value for each access point in the table is averaged over a predetermined number of responses. It has been found that large variations in the RSSI values for a given access point have been recorded even when measured by a stationary mobile unit, varying by as much as 15 counts over one minute, and in order to reduce the range of values and minimise "slow thrashing" (when "thrashing", a mobile unit associates with a first access point, then roams to a second access point after a short period of time and then further access points in a random manner without any long attachment to a single access point and "slow thrashing"

may be interpreted accordingly) the averaging calculation may include the step of discarding values outside a given range, for example ten or more counts below the average RSSI value.

Once the RSSI values have been calculated, an "eligible group" of access points is selected (12), including all access points having an RSSI value no more than six counts below the best detected RSSI value. From that group the access point having the lowest load factor (LF) is determined (13,14). The load factor is a measure of how many mobile units are currently associated with a given access point; in the present case the load factor is represented by a simple numerical value representing the exact number of associated mobile units. The access point thus selected is the most eligible access point and the mobile unit then selects that access point for association. If more than one access points within the eligible group exhibit the same load factor then, of those, the access point having the highest RSSI value is selected as the most eligible access point and the mobile unit associates with that access point.

The mobile units are programmed to carry out an update probe at predetermined intervals. In the present embodiment each mobile unit carries out a full scan, probing all seventy nine channels, upon power up and every thirty seconds. Full scans last approximately looms. In addition partial scans, covering known access points, are performed every five seconds. The probe response packet transmitted by an access point contains all necessary synchronisation information for a mobile unit to latch on to the current channel of the access point and follow the hopping pattern at any stage. In an alternative arrangement the RSSI value for the access point is calculated not from the strength of the probe response signal but from the strength of the "beacon packet" issued by the access'po'int. Each access point issues a beacon packet every 100 milliseconds containing, in addition to other information, timing information similar to that contained in the probe response packet.

A slightly different approach- is taken where a mobile unit is currently associated with an access point but at a communication level that is unsatisfactory. An unsatisfactory communication level may be identified, for example, when more than fifty per cent retries, cyclic redundancy code (CRC) errors or missed beacons are detected. In that case the mobile unit will re-associate using the steps illustrated in Figs. 2a and 2b except that the access point with which the mobile unit was experiencing poor communications will be excluded from the eligible group of access points (see step (12) of Fig. 2b). The in-eligible access point can, however, in due course be re-admitted to the eligible group after a succession of acceptable RSSI values have been observed.

It should be noted that a mobile unit experiencing poor communication will re-associate only if an eligible access point is identified.

In cases where a mobile unit is not experiencing an unsatisfactory communications level (as defined above) it makes a roaming decision every five seconds after a partial scan. Once again the steps described above with reference to Fig. 2b are carried out, but with the following modifications:

1. The current access point is included in the eligible group if its RSSI value is no more than eleven counts below the best RSSI value.

2. When choosing the access point having the lowest loading factor in the group, access points having a loading factor which is more than 75% of the loading factor of the current access point loading factor are excluded.

The additional steps enable the mobile unit to avoid "frivolous roaming" that is to say, re-association with new access points when the current access point is in fact satisfactory.

The system thus allows preemptive roaming providing for dynamic load balancing, that is, a mobile unit may re-associate with a new access point although it is not experiencing poor communications with a current access point, but the newer access point will offer considerably improved communications. The possibility of a mobile unit losing contact with an access point altogether and experiencing periods where it is not communicating with any access points, may thus be avoided.

In addition, the system has been improved by adjusting the sensitivity so that a mobile unit will not tend to roam from a current associated access point to another at the rate that it would otherwise, where the signal strengths of various access points are similar in magnitude. Accordingly, greater stability is achieved.

In a further modification the probe packet may include an identification of the access point that the mobile unit is currently associated with for example, the BSS ID. Such an arrangement would be more reliable than the messages passed between access points relaying re-association events.

A further embodiment of the invention is shown in Fig. 4. In some cases it may be desirable to provide information concerning the physical location of a mobile unit. For example the information may be provided to a system administrator 20 who may take action based on the information. Alternatively the house computer 4 may take action automatically on the basis of certain information.

For example, mobile units are often used in stock exchanges by traders for receiving orders and executing trades, as it is illegal to execute trades outside the building. In order, therefore, to determine whether a mobile unit is being removed from the building, access points 5 are provided adjacent each exit door 21. Each access point 5 is equipped with a directional (horn) antenna 22 designed to provide a strong signal over a narrow pattern in the vicinity of and covering the whole of the doorway.

According to the roaming operation of the mobile units discussed above, any mobile unit will associate with an access point having high signal quality and which is lightly loaded and hence any mobile unit passing an access point 5 over an exit door 21 (when a mobile unit is being taken through the door) will associate with that access point. Once the system has detected that a mobile unit has associated with an access point over an exit door 21 the necessary steps can be taken by a house computer. For example an alert can be sounded which may in addition disable operation of the mobile unit. It is, of course, possible to identify which exit door the mobile unit was being taken through by identifying the physical location of the associated 5 access point.

In the embodiment shown in Fig. 4 a cellular communications network is in use in a self-checkout retail system where wireless mobile units are provided to customers for the purpose of scanning their own 10 purchases, for example, using bar code symbols. In that case an access point 5 provided over an exit 21 could be used to alert the store management 20 that a scanner was leaving the premises and to sound an alarm at the door.

Without further analysis, the foregoing will so 15 fully reveal the gist of the present invention that others can readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generical or specific aspects of this invention and, therefore, such adaptions should and are intended to be comprehended without the meaning and range of equivalence of the following claims.

Cited By (2)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
DE102008032872A1	2008-07-14	2010-01-21	Wincor Nixdorf International Gmbh	Security system for merchandisers
KR20150019892A *	2013-08-16	2015-02-25	삼성전자주식회사	Data communication method and apparatus using a wireless communication

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
US5850605A	1998-12-15	Method and apparatus for dynamically grouping transmitters for message transmission in a communication system
US4475010A	1984-10-02	High density cellular mobile radio communications
US6138019A	2000-10-24	Cellular system hand-off protocol
US7742764B2	2010-06-22	Method and apparatus for determining appropriate channels for communication
US5517677A	1996-05-14	Adaptive weighting of a scanning sequence
US6275703B1	2001-08-14	Controlling handover in a mobile communication network
US6697013B2	2004-02-24	Radar detection and dynamic frequency selection for wireless local area networks
US6208629B1	2001-03-27	Method and apparatus for assigning spectrum of a local area network
US6856789B2	2005-02-15	System and method for bluetooth paging with transmit power reduced according to channel metrics measured during inquiry process
US5594943A	1997-01-14	Method and apparatus for efficient handoffs by mobile communication entities
Guan et al.	2006	Genetic approach for network planning in the RFID systems
US20060292968A1	2006-12-28	System and method for determining channel quality in a wireless network
US20040203762A1	2004-10-14	Operating an ad-hoc wireless network in one or more regulatory regions
US20060128312A1	2006-06-15	Wireless communication management system and supporting method and apparatus
US7756542B1	2010-07-13	Managing a radio environment without location information
US7426398B2	2008-09-16	Techniques to select data rates for a wireless system
US6466793B1	2002-10-15	Automatic frequency allocation (AFA) for wireless office systems sharing the spectrum with public systems
US7206840B2	2007-04-17	Dynamic frequency selection scheme for IEEE 802.11 WLANs
US6915123B1	2005-07-05	Method and system for monitoring an operational area of a subscriber station
US7400901B2	2008-07-15	WLAN having load balancing based on access point loading
US20050037798A1	2005-02-17	Mobile station, mobile communication system, and cell selection method
US20090252127A1	2009-10-08	Building wireless routing structures using out of band signaling
US5379451A	1995-01-03	Mobile communication system and location registration method in mobile communication system
US5355522A	1994-10-11	Frequency selection method and apparatus
US20020176386A1	2002-11-28	Software for installation and configuration management of network nodes

Priority And Related Applications

Priority Applications (3)

Application	Priority date	Filing date	Title
US549,051		1995-10-27	
US08/549,051	1989-06-29	1995-10-27	Preemptive roaming in a cellular local area wireless network
CA 2186923	1995-10-27	1996-10-01	Preemptive roaming in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2005-05-30	EEER	Examination request	
2016-12-05	MKEX	Expiry	**Effective date**: 20161003

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Patents

Mobile unit algorithms for use in a cellular local area wireless network

Abstract

A wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.

CA2564287C

Canada

Find Prior Art Similar

Other languages: French

Inventor: Frederic Heiman, Patrick Pinard, Andrew Werback, Michael Shiba, Robert Beach

Current Assignee : Symbol Technologies LLC

Worldwide applications

1997 CA

Application CA2564287A events

1996-11-08 Priority to US08/747,034

1996-11-08 Priority to US747,034

1997-10-15 Application filed by Symbol Technologies LLC

1997-10-15 Priority to CA002218268A

1998-05-08 Publication of CA2564287A1

2010-08-24 Application granted

2010-08-24 Publication of CA2564287C

2017-10-15 Anticipated expiration

2019-02-24 Application status is Expired - Lifetime

Info: Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (20)

1. A wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.

2. A wireless communications network according to claim 1, wherein said second unit includes a screen for display of said message.

3. A wireless communications network according to claim 2, wherein said screen also displays said plurality of options.

4. A wireless communications network according to claim 3, wherein said screen is touch-sensitive, and in which said second unit is arranged to display said plurality of options on said screen for selection by said user touching said screen.

5. A wireless communications network according to claim 3, wherein said second unit includes a plurality of data-entry keys, said user selecting one of said plurality of options by pressing one of said keys.

6. A wireless communications network according to claim 5, wherein said data-entry keys comprise an alpha-numeric keyboard.

7. A wireless communications network according to claim 1, wherein said first unit includes a first information store and said second unit includes a second information store, said first and second stores holding first common information for encoding and decoding said coded portion of messages between said first and second units.

8. A wireless communications network according to claim 7, wherein said information stores are arranged to contain user-definable and updatable information.

9. A wireless communications network according to claim 7, wherein said second unit is a mobile unit and said second unit is a base unit, said network further including a third, mobile, unit having a third information store; and said first and third stores holding second common coding information for encoding and decoding said coded portion of messages between said first and third units, said second common coding information differing from said first common coding information.

10. A wireless communications network according to claim 1, wherein said second unit is arranged to transmit a coded response back to said first unit on said user selecting one of said plurality of options.

11. A wireless communications network according to claim 1, wherein said coded portion further includes information representative of text, said text being displayed to said user after said second unit decodes said coded portion.

12. A wireless communications network according to claim 1, wherein said first unit is arranged to transmit a composite message having a tree-like structure.

13. A wireless communications network according to claim 12, wherein said coded portion includes information allowing said user to traverse said tree-like structure.

14. A wireless communications network according to claim 13, wherein said second unit includes a screen for display of said message, said tree-like structure being displayed by means of a series of linked menus having user-selectable options.

15. A wireless communications network according to claim 1, wherein said mobile unit comprises a portable computer terminal.

16. A wireless communications network according to claim 1, wherein said mobile unit includes a bar-code scanner.

17. A wireless communications network according to claim 1, wherein said mobile unit is arranged to communicate with said base unit via one of a plurality of spaced access points, communication between said mobile unit and said access points being by wireless telegraphy.

18. A wireless communications network according to claim 17, wherein said communications network is a cellular communications network.

19. A wireless communications network according to claim 1, wherein said base unit includes a cradle for holding said mobile unit when not in use.

20. A wireless communications network according to claim 19, wherein said cradle and said mobile unit include electrical connections for downloading information stored within said mobile unit to said base unit.

Description

MOBILE UNIT ALGORITHMS FOR USE IN A CELLULAR LOCAL
AREA WIRELESS NETWORK
This is a division of co-pending Canadian Patent Application No. 2,218,268 filed on October 15, 1997.
s BACKGROUND OF THE INVENTION
1. Field of the invention The invention relates generally to cellular networks. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points.

2. Description of the Related Art Wireless local area networks (LAN's) are used in business applications such as inventory, price verification mark-down, portable point of sale, order entry, shipping, receiving and package tracking. Such systems are often proprietary systems wherein the operator carries a mobile unit such as a hand-held computer communicating with a house computer via one of a plurality of access points connected to the house computer and to one another, each access point interacting with the house computer to create a wireless cell.

In order to achieve inter-operability of the various proprietary systems a draft standard IEEE 802.11 has been proposed (the IEEE 802.11 draft specification is available for public inspection).
The draft standard includes features such as 1 Mbps and 2Mbps data rates, carrier sense multiple access/collision avoidance (CSMA/CA), a power-save mode for battery-operated mobile stations, seamless roaming in a full cellular network, high throughput operation, diverse antenna systems designed to eliminate "dead spots", and an easy interface to existing network infrastructures.
The term "roaming" relates to the scanning by each mobile unit of all access points to identify and associate with an eligible access point. Roaming between cells provides great flexibility and is particularly advantageous in locations that are difficult to wire, for simple relocation of work stations, and for portable work stations. The IEEE 802.11 protocols support either direct-sequence or frequency-hopping spread-spectrum systems, as well as infrared communications. Each access point executes a unique hopping pattern across 79 non-overlapping frequencies at a rate of one hop every 100 milliseconds, 66 hopping patterns being specified in the IEEE 802.11 draft standard and being selected to minimize the possibility of interference. Frequency hopping spread-spectrum systems are preferred by the majority of users as they allow increased capacity and decreased interference.
Although the IEEE 802.11 draft specification provides the basic packet types which can enable roaming it does not actually set the roaming algorithm.
According to the draft specification the mobile unit determines the access point with which it will associate and the access point must accept the mobile unit unless it is defective or certain alarm conditions exist, such as memory full.
There is, however, no suggestion of how, or by what criteria, other than those mentioned above, the mobile unit might select an appropriate access point, or the optimum access point.
U.S. Patent No. 5,276,680 relates to a communication system including a plurality of portable units and a plurality of controllers wired to a network.
Each portable unit polls all of the controllers to establish whether it can associate with any controller and receives a response from any controller having less than a predetermined number of portable units already associated therewith.
SUMMARY OF THE INVENTION
According to the present invention, there is provided a wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.
Typically, the network will include a central base station or house computer which is in communication with a number of hand-held units, such as portable computer terminals or bar code scanners. In the preferred embodiment, messages may be transmitted from the central computer to one of the mobile units by transmitting an addressed message by wireless telegraphy. That message may include text and/or graphics, along with a coded portion defining several possible answers to the message. The receiving mobile unit decodes the coded portion, and displays not only the message but also the possible options on a screen. The user may then select the option, for example by touching a touch-sensitive screen, to reply. The response then goes back to the base unit in coded form, thereby reducing the amount of data that has to be transmitted across the wireless portion of the network.
Both the base unit and the mobile unit preferably include an information store, such as a hard disk and/or a random access memory.
The stores contain common information enabling coded messages to be sent and decoded in a previously-agreed way. In addition to the encoded information representing possible responses to messages, it may also s represent textual data records which are present in both the store of the mobile and the store of the base unit.
In addition, in a further preferred embodiment, messages may be transmitted using a tree-like data structure. Encoded portions of the message, understood both by the mobile unit and the base unit, may define i o the manner in which the tree is built up. When the mobile unit decodes these portions, it may display to the user, for example on a screen, the full structure of the message. This may conveniently be done by displaying to the user a nested sequence of menus, each menu having several user-selectable options. Some or all of these options may not only allow the user to select a sub-menu, but may also activate a coded response back from the mobile unit to

the base unit, thereby providing the base unit with information on which options have been selected by the user.
The common information stored within the base unit and within the mobile unit may be user-definable and updatable. One way of achieving 2 o this is to provide a cradle, attached to the base unit, into which the mobile unit may be placed when it is not in use. Electrical connections on the mobile unit and on the cradle allow information within the mobile unit to be downloaded into the base unit. Similarly, information may be uploaded from the base unit to the mobile unit.
2 s Alternatively, the information store within the mobile unit may be removable (for example a removable read-only memory). The read-only memory containing one particular set of encoding information may then be replaced, at will, with another read-only memory containing another set.
In that way, the mobile unit may easily be re-programmed for a variety of different applications. There may be several mobile units on the network, each having a s different set of encoding information. All of the various sets may be maintained simultaneously at the base unit, and the communication between the base unit and any given mobile unit is then encoded according to its own individual information set.
According to a further aspect of the invention there is provided a ~ o mobile unit for use with a wireless communications network, said unit including a radio transmitter/receiver and a timer for instructing said radio to enter a power-saving mode after a period of no message traffic; said radio automatically reverting to normal powered operation when a radio signal is received or is to be sent by said radio. The invention also 15 extends to a corresponding method of operating a mobile unit within a wireless communications network.
According to the invention there is also provided a data communications network including a plurality of stationary access points and a plurality of mobile units, a mobile unit being capable of 2 o communicating with at least two access points in a predetermined range therefrom, comprising:
means in the mobile unit to scan for and associate the mobile unit with the most eligible access point at predetermined intervals, the most eligible access point being selected according to each of the following 2 5 Criteria;
(a) received access point signal quality; and (b) loading factor at the access point.

Accordingly, a simple and reliable arrangement is provided enabling preemptive roaming and optimum selection of an access point for association with a mobile unit. Each mobile unit may select a group of eligible access points and s select the most eligible access point from that group. The received access point signal quality may be represented by the received signal strength indication (RSSI). The loading factor may be defined by the number of mobile units associated with a given access point. The cellular communications network may comprise a IMbps frequency-hopping s o spread-spectrum wireless LAN conforming to the IEEE 802.11 draft specification.
Each mobile unit may send out a probe message packet to all access points wherein the probe packet has no destination address but a mobile unit specific source address. The probe packet may include an 1s identification of the access point with which the mobile unit is currently associated. Each access point that detects the probe packet may send a probe response packet containing the following information:
access point address;
access point frequency hopping pattern;
2 o access point present channel;
time remaining in present channel;
loading factor.
The mobile unit may carry out its selection on the basis of the signal quality of, and information contained in the received probe response 2 s packets or the access point signal quality may be determined from a beacon signal sent by the access point independently of a probe response packet.
Each mobile unit may store the 1ZSSI value for each access point and calculate an average value over a predetermined period, and RSSI values outside a predetermined range may be omitted from the averaging calculation.
Each mobile unit may carry out a full scan of all available frequency s channels on power-up and thereafter at regular intervals. The full scan may be carried out at approximately thirty second intervals. Each mobile unit may carry out a partial scan of known access points at regular intervals more frequently than a full scan is carried out, for example at approximately five second intervals.
1 o Each mobile unit not associated with an access point may identify on scanning all access points with signal quality equal to or above a threshold value and select for association the access point having the lowest loading factor; when two or more access points have an equal lowest loading factor the access point having the highest R~SI value may ~ 5 be selected. The threshold value may be set at six counts below the highest detected RSSI value.
A mobile unit associated with an access point and experiencing an unacceptably low communication level may roam excluding the current access point from selection. The unacceptably low communication level 2 0 may be achieved when more than 50% retries, CRC errors or missed beacons are experienced. The excluded access point may be re-included for selection when its RSSI value has increased by a predetermined limit.
If no eligible access points are identified for re-association the mobile unit may continue to associate with the current access point.
2 s A mobile unit associated with an access point and achieving a satisfactory level of communication may make a scanning decision at predetermined intervals. A satisfactory communication level may be CA 02564287 2006-11-03 ---' ---achieved when ~0% or less retries, CRC errors or missed beacons are experienced. An eligible group may be selected comprising all access points with signal quality above a predetermined threshold, the group including the current access point when its signal quality is above a further s predetermined threshold, and the access point may be selected having the lowest loading factor; access points having a loading factor of more than a given proportion of the current access point loading factor may be excluded and where two or more access points have the same loading factor, the access point having the highest signal quality may be selected.
s o The eligible group threshold value may be six counts below the highest received RSSI value, the current access point further threshold value may be eleven counts below that RSSI value, and access points having a loading factor of more than 75% of the current access point loading factor may be excluded.
15 Each mobile unit may carry out a partial scan of known access points at predetermined intervals and may carry out the roaming decision immediately after the partial scan.
The communications network may be included in one of an inventory, price verification, mark-down, portable point of sale, order entry, 2 o shipping, receiving and package tracking systems.
According to the invention there is further provided a mobile unit for use in a cellular communications network comprising a plurality of access points, the mobile unit including a communications system for association with an access point and a selection system for scanning all 2 s access points, selecting a group of eligible access points for association and selecting from that group a most eligible access point, selection being carried out according to the following criteria:

lo a received access paint signal quality; an,d loading factor.
According to the invention there is fvtther provided a r~lular communications network comprisir~~ a plurality of mobile onus and a plurality of access points, the mobile unit being arranged eo roam and associate with a selected across point, the mobile unit including a selecrion systsm for selecting a group of eligible access points for association and seirctiug from that group the most eligible access paint, selection being carried out according to the failo~,~~i,~g c"ittria:
1o received access point signal quality; anu leading factor.
According to tb.e invention there is further provided a method of operation of s cellular communications not<vorlC, the network including a plurality of access points in communication with cacti other and a plurality ~.s of mobile units wherein:
each mobile unit scans for and associates with the must eligible access point at predetermined intemals, each mobile unit selecting a group !
of eligible access points and, from thax group, selecting the mast eligible acocss point according to the following criteria:
a o x~coived access point signal quality; and loading factor.
According to the invention there is yet further provided a data communications network including a plurality of Stativnaty access points and a plurality of mok~ile units wherein:

2 5 each mobile unit scans for and 5elocts as aligibir access point for assxiation therewith on the basis of received access point signal quality and loading factor at the access point and wherein;

a physical area is defined within which all mobile units must be kept and access points are provided adjacent the or each exit point from the physical area.
The access point at the exit point may include a directional (horn) antenna providing a strong signal in the vicinity of the exit point.
The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in conjunction with the accompanying drawings. It is to be understood that the invention may be carried into practice in a number of ways, and the described embodiment is not intended to be limiting.
In accordance with one aspect of the present invention there is provided a wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.
BRIEF DESCRIPTION OF THE DRAWINGS
Fig. 1 is a schematic view of a radio terminal suitable for use in a preferred 2 0 embodiment of the present invention;
Fig. IA shows an exemplary structured message that may be received by the unit of Fig. I;
Fig. 1B shows one preferred form in which the message of Fig. IA may be transmitted over the wireless link;
Fig. 2 shows an alternative embodiment to that shown in Fig. 1;
Fig. 2B shows, schematically, the functional elements that make up the radio terminals shown in Figs. 1 and 2;

Ila Fig. 3 is a schematic illustration showing the communication system of the preferred embodiment in operation;
Fig. 4 is a block diagram illustrating the steps carried out by a mobile unit during the roaming process;
Fig. 5 is a flow chart illustrating the steps carried out by a mobile unit for selection of the most eligible access point;
Fig. 6 shows a probe response message typically sent by an access point according to the present invention; and Fig. 7 is a schematic illustration showing a further embodiment of the communication system of the present invention.
DETAB.ED DESCRIPTION OF THE PREFERRED EMBODIMENT
1 o Turning first to Fig. 1, there is shown a portable radio terminal suitable for use as a mobile unit in a preferred embodiment of the invention. The radio terminal or mobile unit 30 has a housing 32 of a suitable size either to be hand-held, or to be attached to a user's wrist or forearm by means of a rear strap (not shown). The front of the housing has a touch sensitive screen 34 which is used not only to display information, but also to input data, for example by pressure of the user's finger or of a pen on the screen surface. The unit includes a radio transmitter/receiver 35 and a laser-based oprical scanning mechanism, both contained within a generally spherical rotational housing 36. The optical 2 o scanning mechanism produces a one-dimensional or two-dimensional pattern of scanning laser light, which leaves the housing 36 via an aperture 38. The laser light impinges upon an indicia to be read (not shown), for example a bar code, and is reflected back to the mobile unit 30 where it is detected. The radio transmitter/receiver is arranged to communicate with 2 s a base unit or backbone house computer 4, shown schematically in Figure 3. 'lhe house .computer 4 may include one or more data entry terminals or screens 4a, and a hard disk or other data storage device 4b.

The mobile unit 30 remains in wireless communication with the house computer 4 via the radio- transmitter/receiver 35. This may receive and transmit not-only textual data, entered via the touch-sensitive screen 34, but also data representing a bar code which has been scanned by the optical s scanning mechanism 37.
In the preferred embodiment of the invention, the mobile unit 30 includes a fixed or removable memory 49; if the memory is designed to be removable, a slot 48 in the housing is provided for that purpose. The unit also includes an electrical connection 46 allowiag the information in 1 o the memory 49 to be downloaded to the house computer 4 when the unit is returned to a docking station 4c (Fig. 3). Additionally, the information stored in the memory 49 may at that stage be updated under control of the house computer 4.
In addition, the mobile unit 30 includes an LED 40, and a miniature 1 s speaker 42.
Fig. 2 shows an alternative embodiment which differs from the embodiment of Fig. 1 merely by having a series of truc buttons, or a keyboard 44'.
Fig. 2B shows, in purely schematic form, the major structural 2 o elements that go to making up a mobile unit of the type shown in Fig. 1 or Fig. 2. Each of the elements is known per sc, and it will be evident to a skilled man in the art how to link them into a unit which operates as described.
As shown in Fig. 2B, the mobile unit has two basic portions, a radio 2 s section generally indicated at 50 and a terminal section generally indicated at ~2. These two sections communicate with each other via an interface 54.

The radio section 50 incorporates a radio transmitterlreceiver 56 and an ariel 58 for communicating with a remote access point 5 (Fig. 3).
The terminal section 52 includes a random access memory 60, a screen 62, a CPU 64 and an optional keyboard 66. In addition, for s scanning operations, the section is provided with a scanning mechanism 68 and a laser and optics assembly 70 for producing an outgoing scanning laser beam 72. The reflector beam is detected by a photodiode 74. All of these devices are operated by a main battery 76.
The CPU 64 includes a clock 78. A further CMOS clock 80 is also 1 o provided, which has its own battery 82. Accordingly, the unit is capable of keeping track of the time even when the CPU 64 is powered down.
In the preferred embodiment, the mobile unit 30 may double as a personal pager, with messages and other information being transmitted to and from the house computer 4. In a typical prior art pager, messages are ~ s transmitted in textual form, both to and (if the pager has the capability) from the remote unit. The embodiment shown in Fig. 1 however, has an additional capability which may significantly reduce the amount of information that has to be transmitted across the wireless link.
In the preferred embodiment, common coded information is stored 2 o both within the memory 49 of the mobile unit, and centrally on the house computer 4, for example on the hard disk 4c. This enables textual information to lx transmitted by way of short codes, with both the transmitting unit and the receiving unit being party to the same code protocol.
2 5 For example, if a user wishes to send a message from the house computer 4 to a mobile unit 30, he simply types the message to be sent on the terminal 4a. Attached to the message may be a series of codes A,B,C

which represent possible responses to the message. In the example shown in Fig. 1, the message is "please confirm meeting time", with the possible V responses being A-6pm; B-7pm; - C-8pm. On receipt of the codes A,B,C, the mobile unit decodes them using information stored within the memory s 49, and displays the corresponding text on the screen 34. In addition, the screen may also display virtual "buttons" 44 that the user may press to respond to the message. For instance, if the user wishes to confirm that the meeting time is 6pm, he simply presses the screen at the position shown by the virtual "button" A, which instructs the radio-i o transmitter/receiver 35 to send a coded A signal back to the house computer 4.
It will of course be understood that in a practical embodiment, the codes A,B,C will be encoded bit-wise for wireless transmission. The three buttons shown accordingly require the transmission of just two bits of 15 information across the wireless link. It is of course envisaged that there may be more or fewer than three buttons, and that the number of buttons may be selected by the person sending the message. In a further development, the message sent may be represented by a tree-like data structure; this is shown in Figure 1A. in that example, the message 2 0 appearing on the user's screen is "Is the meeting still on?", along with two options. A-YES and B-NO. If the user selects A, a further message appears - "please confirm time" - along with three further options: C-7pm, D-8pm and E-9pm. The user then selects either C,D or E and a coded message is sent back to the house computer which is there decoded 2 5 according to the information stored on the hard disk 4b. On the other hand, the user may

select option B, in which case the coded message is sent back informing the house computer that the meeting has been cancelled.

Fig. 1B shows one form in which the message structure shown in Fig. 1A may be transmitted from the house computer 4 to the mobile unit 30. The message 100 starts with a header 101, an identifier 102 which identifies the particular mobile unit that the message is directed to, followed by the first textual part of the message 103. Linking information 104 follows, which defines where the textual part 103 is linked to the options to be presented to the user at that point. That is followed by coded information A 105 and B 106, representing respectively "YES" and "NO". Further linking information 107 follows, which indicates how the next textual message 108 is to be linked to the data structure previously defined. Further linking information 109 follows, specifying how the textual information 108 is to be linked to the subsequent codes C 110, D
111 and E 112.
Other equivalent message structures could of course be devised by those skilled in the art.
In a practical embodiment, there will of course be several individual mobile units 30, each with its own identifier. Messages transmitted by the wireless system may be addressed to a particular unit by means of the ID 102 (Fig. 1B). Since each unit decodes only messages which are intended for it, it is possible for different units to use a different series of codes A,B,C and so on when communicating with the house computer 4. The house computer 4 in that event maintains information simultaneously on several different encoding protocols, and chooses the appropriate protocol according to the particular mobile unit that is to be addressed, or from which a message has been received.
Fig. 2 shows an alternative mobile unit 30' , which is identical with the unit of Fig. 1 except that the user responds by pressing one of a series of true buttons 44' on the housing 32. In this embodiment, the screen 34 needs to indicate specifically to the user which button represents which response. The buttons 44' may be in addition to or may comprise a form of the numeric keyboard.
Referring now to Fig. 3, there is shown a fizrther application of a s cellular wireless communication system, in the field of inventorying. One or more operators 1 each carry a mobile unit 2, such as a portable computer (or a unit as shown in Fig.l or Fig. 2). Tnformation conee-rning the items 3 to be inventoried is entered into the mobile unit 2, for example by scanning bar code symbols on the items 3.. In order to communicate the 1 o information obtained to a backbone house computer 4 a plurality of access points 5 are provided each connected to the house computer 4 and one to another, each access point 5 together with the backbone house computer 4 forming a cell. The house computer 4 may include a screen 4a and a hard disk or other data storage device 4b. One or more docking stations 4c may 15 also be provided for receiving unit 2 and for downloading the information stored therein. Depending on the location of the operator 1 it is desirable that the mobile unit should select the optimum access point; in addition, if conditions change, for example if the operator 1 changes position, it is desirable that the mobile unit 2 should, if necessary, re-associate with a 2 o new access point if the current access point S dots not allow a satisfactory performance or the new access point offers an improved performance.
The mobile unit 2 and access points 5 are arranged for wireless communication at radio frequencies, for example, 2.4GHz in the industrial scientific medical (IS11~ band.
The steps carried out by a mobile unit 2 which 2 5 is not currently associated to an access point in selecting an access point are shown in Figs. 4 and S. As shown in the block diagram of Fig. 4 the mobile unit (MI1) firstly sends out a probe packet (6) to all access points (AP). The probe packet contains the mobile unit source address but has no destination address and hence any access point that detects the probe packet must send a response. Accordingly, the probe packet is detected by all access points within range (7) and each of those access points sends out a probe response packet (8).
The form of the probe response packet is shown in Fig. 6. The information contained therein includes the access point address, the hopping pattern, the present channel, time left in the present channel, the loading factor (discussed in more detail below) and any other timing information 1 o that may be required. Returning to Fig. 4 the mobile unit associates with the most eligible access point based on the probe response packets that it receives.
Referring to Fig. 5 the mobile unit selects the mast eligible access point in the following manner:
i s As each probe packet response (PPR) is received (10) the signal quality of the response is measured by determining the received signal strength indication (RSSI) (11). For reference, RSSI values generally vary from 25 to 60, with good communications experienced above approximately 35. In practice, rather than relying on a single instantaneous 2 o value, the RSSI information for each access point is placed in a table in the memory of the mobile unit and is updated each time a probe response packet is received from that access point. In order to minimise fluctuation the RSSI value for each access point in the table is averaged over a predetermined number of responses. It has been found that large variations 25 in the RSSI values for a given access point have been recorded even when measured by a stationary mobile unit, varying by as much as 15 counts over one minute, and in order to reduce the range of values and minimise "slow thrashing". When "thrashing", a mobile unit associates with a first access point, then roams to a second access point after a short period of time and then further access points in a random manner without any long attachment to a single access point; the expression "slow thrashi_ag" may s be interpreted accordingly. The averaging calculation may include the step of discarding values outside a given range, for example ten or more counts below the average RSSI value.
Once the RSSI values have been calculated, an "eligible group" of access points is selected (12), including all access points having an RSSI
1 o value no more than six counts below the best detected RSSI value. From that group the access point having the lowest load factor (LF) is determined (13,14). The load factor is a measure of how many mobile units are currently associated with a given access point; in the present case the load factor is represented by a simple numerical value representing the exact 15 number of associated mobile units, The access point thus selected is the most eligible access point and the mobile unit then selects that access point for association. If more than one access points within the eligible group exhibit the same load factor then, of those, the access point having the highest RSSI value is selected as the most eligible access point and the 2 o mobile unit associates with that access point.
The mobile units are programmed to carry out an update probe at predetermined intervals. In the present embodiment each mobile unit carries out a full scan, probing all seventy nine channels, upon power up and every thirty seconds. Full scans last approximately 100ms. In addition 2 s partial scans, covering known access points, are performed every five seconds. The probe response packet transmitted by an access point contains all necessary synchronisation information for a mobile unit to latch on to the current channel of the access point and follow the hopping pattern at any stage. in an alternative arrangement the RSSI value for the access point is calculated not from the strength of the probe response signal but from the strength of the "beacon packet" issued by the access point. Each 5 access point issues a beacon packet every 100 milliseconds containing, in addition to other information, timing information similar to that contained in the probe response packet. A slightly different approach is taken where a mobile unit is currently associated with an access point but at a communication level that is unsatisfactory. An unsatisfactory i o communication level may be identified, for example, when more than fifty per cent retries, cyclic redundancy code (CRC) errors or missed beacons are detected. In that case the mobile unit will re-associate using the steps illustrated in Figs. 4 and 5 except that the access point with which the mobile unit was experiencing poor communications will be excluded from i 5 the eligible group of access points (see step (12) of Fig. S). The ineligible access point can, however, in due course be re-admitted to the eligible group after a succession of acceptable RSSI values have been observed.
It should be noted that a mobile unit experiencing poor communication will re-associate only if an eligible access point is identified.
2 o In cases where a mobile unit is not experiencing an unsatisfactory communications level (as defined above) it makes a roaming decision every five seconds after a partial scan. Once again the steps described above with reference to Fig. 5 are carried out, but with the following modifications 2 5 1. The current access point is included in the eligible group if its RSSI value is no more than eleven counts below the best RSSI value.

2. When choosing the access point having the lowest loading factor in the group, access points having a loading factor which is more than 75°/a of the loading factor of the current access point loading factor are excluded.
The additional steps enable the mobile unit to avoid "frivolous roaming" that is to say, re-association with new access points when the current access point is in fact satisfactory.
The system thus allows preemptive roaming providing for dynamic load balancing, that is, a mobile unit may re-associate with a new access 1 o point although it is not experiencing poor communications with a current access point, but the newer access point will offer considerably improved corzunnications. The possibility of a mobile unit losing contact with an access point altogether and experiencing periods where it is not communicating with any access points, may thus be avoided.

1 s In addition, the system has been improved by adjusting the sensitivity so that a mobile unit will not tend to roam from a current associated access point to another at the rate that it would otherwise, where the signal strengths of various access points are similar in magnitude.
Accordingly, greater stability is achieved.
2 o In a fiu~ther modification the probe packet may include an identification of the access point that the mobile unit is currently associated with for example, the BSS ID. Such an arrangement would be more reliable than the messages passed between access points relaying re-association events.
2 s The mobile units may incorporate a number of power-saving features, aimed at maximising battery life. These features (known as "power-saving protocols" (PSP), will now be described in more detail.

With reference to Fig.2B, there are generally two reasons why the radio section 50 and the CPU 64 may need to be active. The first reason is to be able to send and receive network messages via the ariel S0. The second is to allow the radio section ~0 to communicate with the terminal s section (sometimes caned the "host terminal") ~2 via the interface 54. In particular, access may be needed to the protocol stack, typically stored in the RAM 60, which is required for operating the PSP.
The PSP makes use of a number of different algorithms, all of which are based on the approach of turning off of the radio 56 and halting the 1 o CPU clock 78 while waiting for the next message from the access point.
It will be recalled that the basic message control system is defined in IEEE
802.11 protocol specification, and involves the use of beacon messages with tragic indicator maps and a poll message to request transmission of the data.
1 s The various PSP algorithms are defined in such as way as to allow a user-definable tradeoff between performance and the level of power saving.
The first algorithm is a static algorithm that wakes up the radio 56 just in rime to receive every broadcast beacon. Even though the CPU
a o clock 78 has been powered down, the system still maintains a record of the time using the CMOS clock 80, which is powered by its own miniature battery 82. A similar second algorithm wakes up the radio 56 in time to receive every other beacon. ~Similarly, algorithms 3 to 10 switch on the radio in time to receive, respectively, every third to every tenth beacon.
2 5 An eleventh algorithm is dynamic, and permits the wakeup signals to be based on the actual message traffic. Whenever the radio section 50 sends a message; or whenever it receives a message, it sets the wakeup interval to a minimum value (usually to wake up in time to receive each expected beacon). This provides for a fast response as long as the traffic is continuous, 'or almost so. If no activity is detected, the algorithm provides for the wakeup interval to be gradually reduced, typically linearly, up to a maximum value of 10; in other words, at that point the radio is woken up just in time to receive every tenth beacon. Alternatively, instead of the delay increasing linearly (intervals of 1, 2, 3...), the algorithm may remain on maximum for a predefined period, with the delay increasing to a maximum value only once that period has been reached.
Io Yet a further algorithm, known as algorithm number 12, provides for even higher performance. In this algorithm, a record is kept of message traffic (based for example on the number of payload bytes or on the number of messages), and when a threshold is exceeded the radio 56 is then switched into continuous mode. As long as significant traffic is being processed, either outgoing or incoming, the radio will stay in continuous mode. However, if the traffic falls below the predefined threshold for a certain number of second (for example 5 seconds), the system then reverts back to algorithm number 11.
For all of the algorithms previous mentioned, the time of the next 2 o beacon is of course precisely known, and may be computed so that the radio can be turned on just in time to receive the beacon_ If the beacon is displayed in the access point 5 (due for example to pre-existing traffic), then the radio 56 will stay awake for some predesned period of time to ensure that the beacon is received.
2 5 Preferably, all mobile units respect the expected time of the beacon and do not transmit messages that might cause the timing of the beacon to be delayed.

2~
If a mobile unit misses a beacon (either because it is not heard, or because it is received with an error), then the unit automatically schedules a wakeup for the next beacon, even if it would not normally expect to wake-up for that particular beacon based on the current algorithm in use.
This permits fast recovery from message errors, and also helps to detect that the access point 5 is or is not transmitting beacons in a minimum amount of time.
The mobile unit is capable of going into a number of operating states or modes for managing the status of the radio 56 and the interface ~4. To 1 o minimise power, the radio 56 is turned on only if radio activity is required, even though the radio unit 50 itself may need to be powered up to allow communications with the terminal section 52. If the radio section 50 powers up to communicate with the terminal section, and it becomes time to receive or to transmit a message, then the radio 56 is automatically 1 s powezed up. Whenevez the radio is no longer needed, but the interface 54 remains active, the radio may be powered down in order to save power.
When the radio section 50 has no requirement to communicate either via the interface 54 or via the aerial 58, all elements of the radio are powered down, as is the CPU clock 78. The system then awaits a wakeup call z o either from the beacon timer or from the terminal section 52 (for example because the user has activated the scanning mechanism 68).
If the mobile unit is unassociatcd with an access point, it may remain in power save mode. In that mode, it automatically wakes up to search for an access point periodically (for example every second), thereby 25 minimising use of power but still providing a reasonable capability of finding an access point with which the unit can associate fairly rapidly.
Once the mobile unit has associated with an access point, it needs to wake up only in order to receive beacon messages.
The mobile unit preferably provides close coupling between the radio section ~0 and the terminal section 52, in order to provide appropriate network support with minimum power usage. The units typically have an s active mode (either full power or power-save mode), a suspend mode (all unnecessary items are off but the CPU can resume at any time), and a power-off mode (minimum power, with no internal activity except for the CMOS clock 80, but still able to resume from where it ieR off before the power was cut).
1 o The radio section ~0 is tightly integrated with the terminal section - 52 in several ways, thereby permitting joint power saving modes. Firstly, the radio section may be set to remain in its prescribed operating mode whenever the terminal section 52 is active. Second, when the terminal section 52 goes into suspend mode, the radio section 50 is placed in a low i s power mode automatically. This may for example be the PSP algorithm number 10, described above. In this mode, the radio section is capable of receiving messages directed to the terminal section 52. Options exist to allow either directed packets only, or directed and broadcastJmulticast packets. These options allow the customization of the network to 2 o minimize power by minimizing wakeup events. When a qualified packed is received, the radio section places the data in a buffer within the ram 60, and wakes up the terminal section 52. As the terminal section may require some time to wakeup, radio section may buffer received packets until such time as the terminal section is able to process them.
2 s While in the suspend mode, the radio section has the option of powering itself down if no activity has been detected for a prograrnamable amount of time, for example 1 hour. This allows a mobile unit that has been left inactive, or has gone out of range, to limit battery consumption to a reasonable amount.
If the terminal has been turned "off' (left in a powered but fully inactive state), the radio section 50 is automatically put to sleep, the lowest s level of power consumption. In this mode, it does not respond to messages or to wakeup commands. When the terminal sections is then powered up ("Resume"), the radio section itself then automatically powers up and resumes from its present state.
If the terminal section loses power (for example if the battery 76 is 1 o removed), the radio section is automatically switched off or otherwise powered down. In that mode, the battery 82 may act as a backup battery, able to sustain the operating state of the terminal section. Alternatively, a separate backup battery (not shown) may be provided. When the battery 76 is reinserted or an alternative power source such as the mains becomes 15 available, the terminal section is able to resume with no loss of data, automatically powering itself up and reconfiguring the radio section with no intervention required by the operator. After the radio section has been reconfigured, it scans in the normal way for access points and re-establishes association with the network.
2 o The terminal section and the radio section may also be provided with further functionality to prevent a lockup state occurring between the two sections during a suspend or power-down operation. Here, the terminal section interrupts the radio section and commands that no wakeup operaxions be generated for a minimum interval

(for example 1 second).
a s During that interval, the terminal section can then safely suspend or power-down. After that interval has elapsed, the radio section is free to wakeup the terminal section when a message is received.

The terminal section and the radio section may coordinate communications using a command register and an interrupt. In one embodiment, the radio section 50 may include a programmable wakeup timer 99. The radio section 50 may then be woken up either by that timer, or by a message via the aerial ~0, or by a command received from the terminal section 52 via the interface 54.
In order to synchronize the interface 54, the terminal section may generate one of three commands, with the radio section responding with a ready flag. The three commands are Awake for Host, Resume, and Sleep.
1o These cause the radio section to execute different actions, as described below.
In response to the Awake for Host command, the radio section sets the ready flag. This allows the terminal section to communicate directly with the radio section, to receive messages, to send messages and to i s process commands. In response to the Resume command, the radio section turns off the ready flag to indicate that it is in an uncoordinated state, and the radio section can power down whenever it decides that it has finished with communications both with the radio Sb and with the terminal section 52. Tn this mode, the radio section will wakeup whenever a signal is 2 o received from the wakeup timer 99.
In response to the Sleep command, the radio section stops whatever operations it may have been carrying out, in the minimum amount of time, and then goes to a low power suspend mode. When the radio section receives a Resume message, it then reverts back to normal PSP mode.
2 s A further embodiment of the invention is shown in Fig. 7. In some cases it may be desirable to provide information concerning the physical location of a mobile unit. For example the information may be provided to a system administrator 20 who may take action based on the information.
Alternatively the house computer 4 nnay take action automatically on the basis of certain information.
For example, mobile units are often used in stock exchanges by traders for receiving orders and executing trades, as it is illegal to execute trades outside the building. In order, therefore, to determine whether a mobile unit is being removed from the building, access points 5 are provided adjacent each exit door 21. Each access point S is equipped with a directional (horn) antenna 22 designed to provide a strong signal over a 1 o narrow pattern in the vicinity of and covering the whole of the doorway.
According to the roaming operation of the mobile units discussed above, any mobile unit will associate with an access point having high signal quality and which is lightly loaded and hence any mobile unit passing an access point 5 over an exit door 21 (when a mobile unit is being taken i s through the door) will associate with that access point. Once the system has detected that a mobile unit has associated with an access point over an exit door 21 the necessary steps can be taken by a house computer. For example an alert can be sounded which may in addition disable operation of the mobile unit. It is, of course, possible to identify which exit door the 2 o mobile unit was being taken through by identifying the physical location of the associated access point.
In the embodiment shown in Fig. 7 a cellular communications network is in use in a self-checkout retail system where wireless mobile units are provided to customers for the purpose of scanning their own 2 5 purchases, for example, using bar code symbols. In that case an access point 5 provided over an exit 21 could be used to alert the store management 20 that a scanner was leaving the premises and to sound an alarm at the door.
Without further analysis, the foregoing will so fully reveal the gist of the presentw invention that others can readily adapt it for various applications without omitting features that, from the standpoint of prior art.
s fairly constitute essential characteristics of the generical or specific aspects of this invention and, therefore, such adaptions should and are intended to be comprehended without the meaning and range of equivalence of the following claims.

Similar Documents

Publication	Publication Date	Title
US20030104848A1	2003-06-05	RFID device, system and method of operation including a hybrid backscatter-based RFID tag protocol compatible with RFID, bluetooth and/or IEEE 802.11x infrastructure
US20050219120A1	2005-10-06	Power saving mobility aware system and method
US6725060B1	2004-04-20	Method and apparatus for conserving power in an integrated electronic device that includes a PDA and A wireless telephone
US5657317A	1997-08-12	Hierarchical communication system using premises, peripheral and vehicular local area networking
US5949776A	1999-09-07	Hierarchical communication system using premises, peripheral and vehicular local area networking
US6078826A	2000-06-20	Mobile telephone power savings method and apparatus responsive to mobile telephone location
US5706331A	1998-01-06	System and method for selecting a subsystem for message traffic in an integrated communication network
US6640253B2	2003-10-28	Dynamic logical control of network units in ad-hoc communications networks
US6089456A	2000-07-18	Low power telecommunication controller for a host computer server
US6259898B1	2001-07-10	Multi-communication access point
US7733833B2	2010-06-08	Self-configuring, self-optimizing wireless local area network system
US7412246B2	2008-08-12	Method and system for improved wlan location
US6707867B2	2004-03-16	Wireless local area network apparatus
US6869016B2	2005-03-22	Bar code data driven communications by mobile computer terminals operable in wireless networks
US6130603A	2000-10-10	Low-powered RF-linked price display system
US20110212746A1	2011-09-01	Reducing power consumption of wireless devices
US7583643B2	2009-09-01	Enhanced passive scanning
US6901275B1	2005-05-31	Communication system, and communication device and communication method for use in the communication system
US6236674B1	2001-05-22	Transceiver control with sleep mode operation

US20080247377A1	2008-10-09	Independent medium access control for discovering wireless networks
US20070021065A1	2007-01-25	Methods and apparatus for operating an ensemble of wireless electronic devices based on user activity
US7295827B2	2007-11-13	Mobile station dynamic power saving control
US20040014474A1	2004-01-22	Wireless network connection switching management system and method
US5566366A	1996-10-15	Method of power conservation in a data communications system
US6326926B1	2001-12-04	Method of operating a wireless and a short-range wireless connection in the same frequency

Priority And Related Applications

Priority Applications (3)

Application	Priority date	Filing date	Title
US08/747,034	1989-06-29	1996-11-08	Power-saving arrangement and method for mobile units in communications network
US747,034		1996-11-08	
CA002218268A	1996-11-08	1997-10-15	Mobile unit algorithms for use in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2006-11-03	EEER	Examination request	
2017-12-18	MKEX	Expiry	**Effective date:** 20171016

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Patents

Virtual wireless local area networks

Abstract

translated from Chinese

A method of operating a plurality (12) The method of virtual wireless networks using a common distribution system. A plurality of radio network side through a single access point (24) attached to a plurality of wired networks. In this way a message may be a mobile device (22) and a transmission between a LAN (10). LAN and mobile device associated with the identifier, the identifier is used for routing a message to be transmitted. Message transmitted from the mobile device to the corresponding access point, an access point identifier in its memory of the mobile device identifier is compared and assigned label message according to the destination LAN. Message has been allocated the label thereupon transmitted from the access point to the distributed system, the system routes the message to a respective inlet and a local area network.

Classifications

H04W48/18 Selecting a network or a communication service

View 2 more classifications

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Claims (8)

translated from Chinese

A distributed system using a common method for a plurality of virtual wireless networks in operation, comprising: providing an inlet to a plurality of distributed system from the LAN server, each entry associated with a local area network for recognizing a message tag is associated; providing at least one access point coupled to the distributed system, the access point comprising a memory; a wireless service group identifier to each of said local area network associated with the inlet; providing the mobile device service group identifier of the mobile device and one of said inlet associated with; providing the service group identifier and the tag associated with the inlet of the access point associated memory data; operating the moving means so that said at least one access point associated with the associated service group identifier comprises transmitting from the mobile device to the access point; operating the moving means so as to transmit data to the access point associated with the transmission of the service group identifier comprises the mobile device; and operating the access point so that the number of Message from a mobile device associated with said forwarded to the distributed system through the inlet, the inlet of the local area corresponding to the service group identifier associated with said transfer group comprises a verification of the identification whether the service local message tag of said message to said access point associated memory.

2. The method according to claim 1, characterized in that, further comprising operating the access point transmits a beacon so that it has a single primary service group identifier, the access point and operating it with one having primary service group identifier and the mobile device one or more secondary service group identifier associated with the primary service group identifier and the one or more service group identifier to each of the local access point a message memory associated with the tag.

3. The method according to claim 1, characterized in that, by the access point comprises the forwarding made so that each of the transfer label message corresponding to the access point associated with the memory the tag contains a service group identified in the message from the mobile device included with.

4. A method of using a plurality of common operating system virtual distributed wireless network comprising: providing a distributed system from the inlet to the plurality of local area network server, LAN tag associated with the message associated with a respective inlet for identifying ; providing at least one access point coupled to the distributed system, the access point comprising a memory; a domain identifier to each of said, said inlet is associated with a local area network; providing a mobile device having and a domain identifier of the mobile device associated inlet; providing the domain identifier and data associated with the tag associated with the inlet of the access point stored in said memory; operating the mobile reacted with at least one device associated with the access point, the association comprises a domain identifier from the mobile device to transmit to the access point; associated with operating the mobile device to the access point it, and one of said mobile device and the access point in the memory associated with the entry associated with the label; and operating the access point so that the message data Mobile device via the associated distributed system transferred to the inlet that corresponds to the service group associated with the identification of the local area network, comprising the transfer inlet and the associated mobile device the message in a local area network tag.

5. A method for providing a plurality of virtual wireless network system comprising: a distributed system; an inlet coupled to a plurality of distributed systems, each corresponding to at least one network, each associated with an inlet for identifying at least one network message associated with the label; a plurality of mobile devices, each having a said mobile device and a service group identifier associated with the network; access distributed to the at least one coupling system point, the access point comprises a data memory with the service group identifier and the label associated with; wherein said moving means is arranged so that the associated service group identifier comprises at least one access point associated with transmitting from the mobile device to the access point, and to transmit data to the access point associated with the transfer of the

service group identifier comprises the mobile device; and wherein said access point is arranged tag it with a local message, the associated data message from the mobile device via the distributed system transferred to the service group corresponding to the identification phase An inlet associated with LAN, and is arranged to check whether the service group identifier and the message of the access point in the local memory associated with the tag message.

6. The system of claim 5, wherein said access point is arranged so that it transmits a beacon having a single primary service group identifier, wherein the access point is arranged so that the primary service having a the mobile device group identifier and one or more secondary service group identifier associated with the primary service group identifier and the one or more service group identifier associated with each of the access points in a local memory associated message tag .

7. The method according to claim 5, wherein said access point is arranged so that in each of the memory from the mobile device corresponding to said access point forwarding the message comprises a tag associated with the label of the service group identifier contained in the message.

8. A method for providing a plurality of virtual wireless network system comprising: a distributed system; an inlet coupled to a plurality of distributed systems, each corresponding to at least one network, each associated with an inlet for identifying network message to the at least one associated label; a plurality of mobile devices, each having a field identifying the mobile device and the network associated with one of: at least one access point coupled to the distributed system the access point comprises a data memory with the domain identifier tag associated with; wherein said moving means is arranged so that the association of at least one access point is associated with a domain identifier comprises from the said mobile device transmits to the access point, and transmitting data to the associated access point; and wherein said access point is arranged so that with a local message tag, the data from the associated the mobile device corresponding to the memory access entry point of the local area network domain identifier associated with a distributed system transferred to.

Description

translated from Chinese

Virtual wireless local area network

(1) Technical Field The present invention relates to wireless local area networks. More specifically, the present invention relates to a wireless local area network, wherein on a common hardware to be compatible with the system to provide a plurality of virtual wireless LAN.

(2) Background follow IEEE Standard 802.11 wireless data communication protocol communication systems have well known. in these systems, a mobile device and a central computer or other data processing device in data communication through the access point. Access point may communicate with a computer on Ethernet (Ethernet) wired network. Each mobile device and the access point is associated.

In some cases, the system may require the use of a plurality of local area networks and wireless local area networks on the same physical space. Such demand may occur in the airport environment, where multiple users may include airport operations, police or security and airline. Such demand may also occur in the case of cooperation reorganization, when the two companies to temporarily occupy the same physical space. In these cases, for mounting a plurality of systems in order to avoid repetition of the access point, the communication data needs to be routed through the same access point.

Known virtual local area networks (VLANs) can serve multiple users using the same hardware. IEEE 802.1Q standard defines an internal frame recorded in a data packet to identify the VLAN membership.

It is therefore an object of the present invention is to provide a public access points by a mobile communication device and a plurality of service systems methods and apparatus.

(3) According to the present invention, there is provided a distributed system using a common method for operating a plurality of virtual wireless networks. The distributed system is coupled to a plurality of local area network server through the inlet. Each entry is associated with a tag that is associated with a local area network identification message. Each entry is associated with a local area network associated with a wireless service group identifier. At least one access point, which includes a memory coupled to the distributed system, and can be used for communication with the mobile device. Mobile device system has a service group identifier, each mobile device will be associated with a respective inlet that a LAN. Providing data to the access point memory, the service group identifier associated with the tag corresponding to the inlet. The mobile device by the service group identifier transferred from the mobile device to the access point to connect the at least one access point. Once associated with an access point, the mobile device can transmit data to the access point associated with a data service includes a group identifier of the mobile device. Then the data access point by the mobile device to the inlet of a distributed system-area network services forwarding group identifier associated. Transfer of such data would include checking whether the service group identifier and the label information of the local access point in the corresponding memory.

In the preferred distribution, the operation of the access point transmits a beacon so that it has a single primary service group identifier. There is a primary access point service group identifier and one or more secondary service group identifier, each of the access points in a local memory with information associated with the tag. The access point identifier or service group containing a primary or a secondary device comprising a mobile communication service group identifier. In the preferred arrangement, the access point transferring data according to each transponder tag information, the service group identifier associated with the information from the mobile device comprising the tag.

In another embodiment of the present invention, a plurality of common operating a distributed system comprising a virtual wireless network to provide access to a distributed system from a plurality of local area network server. Each entry corresponds to a local area network identification tag message for associating. At least one access point having a memory coupled to the distributed system. Each entry is associated with a local area network identifier associated with one domain. The mobile device also has a field identifying the mobile device and the inlet associated with one. Data access point identifier domain memory tag entry corresponding to the relevant contact. Operation of the mobile device and associate it with a domain identifier transmitted from the access point to the access point the mobile device. In association, the mobile device associated with the access point to a memory corresponding to the inlet of Tags. Then the access point the mobile device the message data associated with a distributed system transferred to the associated service group identifier and the LAN corresponding to the inlet. Forwarding data corresponding to the inlet comprises a mobile device associated with a local area network tag message.

According to the present invention, there is provided a system for providing a plurality of virtual wireless networks. The system comprises a distributed system inlet and a plurality of coupling to the distributed system, each entry corresponding to at least one network. Each entry with a message identifying the respective network associated with the label used. Each mobile device having a mobile device and a service group identifier associated with a network. The at least one access point coupled to the distributed system, and includes a memory containing the data service group identifier associated with the tag. The mobile device is arranged so as to associate at least one access point. This association comprises transmitting the service group identifier from the mobile device to the access point. The access point arranged so that data messages from the mobile device and transferred to the associated service group identifier inlet LAN associated with a local message distribution system through the tag, and checks whether the group identification of the message service bureau associated with the tag field of the message.

In the preferred embodiment, it is arranged so that the access point transmits a beacon having a single service group identifier. And the access point so that the mobile device having a group identifier of the primary service and one or more secondary service group identifier associated with the arrangement. Primary and secondary

service group identifier and the access point in a local memory associated with the tag message. Each access point may be arranged so that the transfer message service group identifier corresponding to the tag associated with the message from the mobile device included in a tag contains.

According to the present invention, there is provided a plurality of virtual wireless networks may be provided in the system, the system comprising a distributed system to the inlet system and distributed to a plurality of coupled, each entry corresponding to at least one network. Each tag entry associated with a network message associated with the identification of at least one. The system provides a plurality of mobile devices, each mobile device has a domain identifier in the network device associated with one of the moved. The at least one access point coupled to the distribution system and including a memory and the data field identification tag associated with. The mobile device is arranged so that it transmits the domain identifier and associated with an access point to the access point. it is arranged by a local access point label message, the data message from a mobile device associated to the LAN and transferred to a corresponding domain identifier associated with the mobile device through the inlet of a distributed system.

For a better understanding of the present invention together with other and further objects, reference will be made in conjunction with some reference to the following description, while the scope of the invention will be pointed out that the appended claims.

(4) FIG. 1 is a block diagram of a virtual wireless network in public distribution system of the present invention is used.

FIG 2 is a flowchart illustrating a service group identifier using the message transmitted from the mobile device to process the respective inlet.

FIG 3 is a flowchart illustrating the use of the domain identity message from the mobile set to the corresponding inlet flow.

(5) DETAILED DESCRIPTION Referring to Figure 1, shows a virtual wireless network according to embodiments of the present invention, which provides data communication between a local area network, e.g., a computer 20, telephone interface 18 or the server 16 and the mobile device 22. System uses access points 24 to provide radio packet data with the mobile communication device 22 using a communication protocol, such as IEEE Standard 802.11, whereby the radio modules to monitor the polling signal in the access point 22 the mobile device 24 and sent to a purpose of data communication with the access point 24 is associated. For example, radio module and an access point for those mobile devices 24 using system developed by the assignee of the spectrum may be the same.

In the system of FIG. 1, each local area network, such as the computer 20, telephone interface 18 and the server 16 or a service group identifier assigned to a particular network or a mobile device and an identifier associated with the domain. Each of these local area networks, respectively through the inlet 14 is coupled to the distributed system 12. 12, the mobile device issued by a distributed system data message routing label contained in the message to the appropriate entry by, for example, specified by the standard 802.1Q label. An inlet disposed so that the reception message issued distributed system, while the inlet will have an associated label message transferred to the inlet coupled to the LAN.

Each mobile device 22 having a group identifier or a service identifier field, the identifier corresponding to the domain identifier or mobile device intends to communicate with the LAN. In one such arrangement described in standard 802.11, the service group identifier (SSID) as an identifier of a wireless communication environment. A different SSID associated with each virtual LAN, wireless in the art such that, on a data message identified by the SSID identifies a wired distribution system by the 802.1Q label.

According to an alternative arrangement may be associated with a virtual LAN each associated with an identifier, such as a draft specification 802.11i provided. Note that the term "domain" as used herein is not limited to the corresponding domain 802.11i standard, but will include other similar properties can be used with a virtual network tag and uniquely identify a mobile device or a data packet identifier. The initial packet switching means comprising a field identifying the mobile. Domain identifier associated with the organization. Access point may accordingly be determined in the domain of the mobile device associated with the process, and then by the message received by the mobile device to provide the appropriate VLAN tag. In this way, each mobile device 22 transmits an identifier to the access point 24, the identifier associated with the mobile device provides a virtual LAN. A memory in the access point identifier corresponding to the mobile device is verified, while the local virtual LAN identifier associated with that message. Then the access point 24 can transfer data to the inlet 14 and the LAN identifier associated with the mobile device corresponding to a distributed system.

In the example shown in FIG. 2, each set of the mobile device gave a service group identifier, which many LAN device using a common distribution system 12 and a common access point 24 associated with one of the mobile . When a mobile device is initialized and the operation need to be associated with an access point, the mobile device monitors the access point beacon messages 24, while a selection is to be an access point associated with the request. The mobile device 30 transmits a request together with the associated service group identifier of the mobile device to the access point 30. in step 32, the access point receives the association request while the service group identifier identifying the service group with the access point in the memory of the mobile device is compared. If one of the service group identifier identifying the service group with the access point in the memory of the mobile device corresponds to the association in step 34 the mobile device is allowed. After the mobile device transmits a data message with a corresponding service group identifier 36 to the access point. Then the access point identifier for the service group and its memory is compared to a service group identifier, while assigning a label for the message in step 38. Tag has been assigned in step 40 to the message is then transmitted through the respective inlets distributed system.

Using the example of Figure 3 domain characteristics similar to the standard 802.11i provided, which sends a domain identifier in the initialization packet exchange between the mobile device and the step 50 of the access point. Domain may advantageously be a tissue or a virtual network associated with a distributed system and therefore the associated inlet. Receiving access point in the domain in step 52 the association request, and the request for the domain associated with the access point in the memory corresponding to the inlet 14 and routing messages in a distributed system to the inlet 14 by tag compare . Optionally, the association request by the access point may be transferred to an authentication server as shown in FIG. 53, the authentication server to verify whether the other safety features corresponding to the mobile device and the virtual network domain or carried. If the memory of the access point and the mobile device domain identifier associated with the inlet corresponds to the label, the correlation step 54 is allowed, the device will identify the tag associated with the domain identifier while moving. In step 56 the mobile device then transmits data messages with the mobile device identifier to the access point. Comparing the mobile device identifier with the mobile device identifier of the access point the access point in step 58, and then sends messages to tag message distributed system. Receiving a message with the label distributed system in step 60 and it is routed to the respective inlet.

The system of the present invention may provide different security configuration message for each virtual LAN. Associated with the mobile device uses the SSID of the VLAN can be mapped as a SSID inlet / / security. Access point by checking the valid key index usage message and decrypting effective to enhance security scheme selected. Security program may be open (Open), shared key (Shared Key) WEP, Kerberos, radial (Radius) and EAP / TLS.

The term access point used herein refers to a composition comprising a cell controller and radio frequency (RF), as in copending Serial No. 09 / 528,697, filed on March 17, 2000, filed as described, which application is assigned the same assignee as the present application, incorporated herein by reference. In such a system, the access point function may be implemented in monolithic form or in the form of assembly by the cell controller.

While have been described herein what are considered preferred embodiments of the present invention, those skilled in the art will find without departing from the spirit of the present invention may be made of other and further changes and modifications, all hereby declare such changes and modifications are within the true scope of the invention.

Patent Citations (14)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
JP3009876B2 *	1997-08-12	2000-02-14	日本電信電話株式会社	Base stations using the packet transfer method and the method
US20020022483A1 *	2000-04-18	2002-02-21	Wayport, Inc.	Distributed network communication system which allows multiple wireless service providers to share a common network infrastructure
US6611763B1 *	2000-02-04	2003-09-09	Inphonic Inc.	Virtual private wireless network implementing message delivery preferences of the user
US7173922B2 *	2000-03-17	2007-02-06	Symbol Technologies, Inc.	Multiple wireless local area networks occupying overlapping physical spaces
JP4126856B2	2000-07-07	2008-07-30	沖電気工業株式会社	Tag-vlan of id automatic identification method
AU7197701A *	2000-07-14	2002-01-30	At And T Corp	Frame classification for qos-driven wireless lans
US7301946B2 *	2000-11-22	2007-11-27	Cisco Technology, Inc.	System and method for grouping multiple VLANs into a single 802.11 IP multicast domain
CN1129272C	2000-12-15	2003-11-26	华为技术有限公司	Virtual local area network access method in ethernet access network
US20040003060A1 *	2001-07-13	2004-01-01	International Business Machines Corporation	Method and apparatus for network connection registration and selection
CN1125545C	2001-12-31	2003-10-22	刘军民	Data formarding method for implementing virtual channel transmission in LAN
CN100440846C	2002-02-28	2008-12-03	威盛电子股份有限公司	Data package transmitting method and network exchanger adopting said method
US6658259B2 *	2002-03-07	2003-12-02	Interwave Communications International, Ltd.	Wireless network having a virtual HLR and method of operating the same
US7688295B2 *	2002-12-19	2010-03-23	Chantry Networks Inc.	Wireless local area communication network system and method
US7492744B2 *	2004-02-06	2009-02-17	Symbol Technologies, Inc.	Method and system for multiple basic and extended service set identifiers in wireless local area networks

* Cited by examiner, † Cited by third party

Cited By (20)

Publication number	Priority date	Publication date	Assignee	Title
WO2010020074A1 *	2008-08-20	2010-02-25	上海贝尔股份有限公司	A method and device for assisting the terminal device operation within the network in access network
CN101959196A *	2010-10-20	2011-01-26	中国电信股份有限公司	WLAN (Wireless Local Area Network) resource sharing method and WLAN network system
WO2016119633A1 *	2015-01-28	2016-08-04	中兴通讯股份有限公司	Access method and device for virtual mobile tenant network
CN103595602B *	2005-07-14	2016-09-07	吉野电气株式会社	And network management
Family To Family Citations				
WO2004077724A2	2003-02-24	2004-09-10	Autocell Laboratories, Inc.	System and method for channel selection in a wireless network
US7869822B2	2003-02-24	2011-01-11	Autocell Laboratories, Inc.	Wireless network apparatus and system field of the invention
US8682279B2	2004-05-07	2014-03-25	Interdigital Technology Corporation	Supporting emergency calls on a wireless local area network
KR101122359B1	2004-05-07	2012-03-23	인터디지탈 테크날러지 코포레이션	Supporting emergency calls on a wireless local area network
US8145182B2 *	2004-05-07	2012-03-27	Interdigital Technology Corporation	Supporting emergency calls on a wireless local area network
US8838963B2 *	2005-02-04	2014-09-16	Apple Inc.	Security enhancement arrangement
FI20055238A *	2005-05-19	2006-11-20	Teliasonera Ab	A system and a base station for wireless networks
WO2007036940A2 *	2005-09-30	2007-04-05	Sandlinks Systems Ltd.	A wide area dynamic rfid system using uwb

GB0521269D0 *	2005-10-19	2005-11-30	Vodafone Plc	Identifying communications between telecommunications networks
US8411616B2	2005-11-03	2013-04-02	Piccata Fund Limited Liability Company	Pre-scan for wireless channel selection
US8818322B2 *	2006-06-09	2014-08-26	Trapeze Networks, Inc.	Untethered access point mesh system and method
US20080009307A1 *	2006-07-06	2008-01-10	Ramesh Sekhar	System and method for optimized wireless client communication
US9240898B1 *	2008-02-28	2016-01-19	Marvell Israel (M.I.S.L.) Ltd.	Integrating VLAN-unaware devices into VLAN-enabled networks
US8711751B2 *	2009-09-25	2014-04-29	Apple Inc.	Methods and apparatus for dynamic identification (ID) assignment in wireless networks
US9326144B2 *	2013-02-21	2016-04-26	Fortinet, Inc.	Restricting broadcast and multicast traffic in a wireless network to a VLAN
CN106231605A *	2015-06-02	2016-12-14	上海贝尔股份有限公司	Method for dynamically creating and deleting vWLAN in shared fixed access network

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
Gruteser et al.	2005	Enhancing location privacy in wireless LAN through disposable interface identifiers: a quantitative analysis
US7130904B2	2006-10-31	Multiple link layer wireless access point
US20050074122A1	2005-04-07	Mass subscriber management
US20030063593A1	2003-04-03	Wireless communication system and wireless LAN access point
US20040014422A1	2004-01-22	Method and system for handovers using service description data
US6801941B1	2004-10-05	Dynamic wireless internet address assignment scheme with authorization
US20120317619A1	2012-12-13	Automated seamless reconnection of client devices to a wireless network
US20040141617A1	2004-07-22	Public access point
US7934005B2	2011-04-26	Subnet box
US20040103278A1	2004-05-27	Native wi-fi architecture for 802.11 networks
EP1081895A1	2001-03-07	Secure wireless local area network
US20100265845A1	2010-10-21	Wireless Local Area Network, Adapter Unit and Equipment
US20060200678A1	2006-09-07	Wireless access point apparatus and method of establishing secure wireless links
US20090119760A1	2009-05-07	Method for reconfiguring security mechanism of a wireless network and the mobile node and network node thereof
US20020022483A1	2002-02-21	Distributed network communication system which allows multiple wireless service providers to share a common network infrastructure
US20050117537A1	2005-06-02	Wireless communication system, wireless base station accommodating apparatus, and data packet transfer method
US20110055928A1	2011-03-03	Method and system for detecting unauthorized wireless devices
US20110078443A1	2011-03-31	Method and system for secure communications on a managed network
US7607015B2	2009-10-20	Shared network access using different access keys
US7269260B2	2007-09-11	Communication system, wireless communication apparatus, and communication method
US20060153375A1	2006-07-13	Data security in wireless network system
US7039021B1	2006-05-02	Authentication method and apparatus for a wireless LAN system
US7127284B2	2006-10-24	Radio LAN access authentication system
US7339915B2	2008-03-04	Virtual LAN override in a multiple BSSID mode of operation
US20090088133A1	2009-04-02	Method and System for Distributing Data within a Group of Mobile Units

Priority And Related Applications

Priority Applications (2)

Application	Priority date	Filing date	Title
US44538103P	2003-02-06	2003-02-06	*US Provisional Application*
US60/445,381		2003-02-06	

Legal Events

Date	Code	Title	Description
2006-04-12	C06	Publication	
2006-06-07	C10	Entry into substantive examination	
2010-01-20	C14	Grant of patent or utility model	
2016-12-07	C56	Change in the name or address of the patentee	
2017-02-01	C41	Transfer of patent application or patent right or utility model	

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Patents

System and method for battery conservation in wireless stations

Abstract

Described are a system and method for battery conservation in a wireless station. Initially, a wireless station switches, according to a predetermined time schedule, from a first communications mode into a second communications mode. The station is capable of at least one of receiving and transmitting data packets only when the station is in the second communications mode. The first mode is a power conservation mode. When the station is in the second mode, a wireless access point obtains a priority access to a radio channel. Then, the access point reserves the radio channel for wireless communications between the access point and the station. Wireless communications are conducted between the access point and the station over the radio channel. Upon a termination condition, the station switches into the first mode.

CN101036061A

China

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Other languages: Chinese

Inventor: 曾兆, 卜A·王

Worldwide applications

2005 CN

Application CN 200580030126 events

2004-08-05 Priority to US9914204P

2005-07-07 Application filed by 讯宝科技公司

2007-09-12 Publication of CN101036061A

Info: Cited by (6), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (19)

translated from Chinese

A method for wireless communication, the method comprising: (a) in accordance with a predetermined schedule, the wireless station switches from the first communication mode to the second communication mode, in which only the station in the first when the second mode to perform packet reception and transmission of at least one of the first mode to the power saving mode; (b) when the station is in the second mode, obtain the radio channel through the wireless access point priority access; (c) after step (b), the radio channel reserved by the access point for wireless communication between the access point and the station; (d) through the radio channel performing wireless communication between the access point and the station; and (e) upon termination condition is satisfied, the station will be switched to the first mode.

2. The method according to claim 1, wherein said termination condition is one of the following: (a) with the end of service period (EOSP) packet indicator, (b) with indicator EOSP null packet, (c) confirm the package with an empty data field, (d) a predetermined time expires, and transmitting a predetermined number of data packets (e) between the station and the access point.

The method according to claim 1, characterized in that, to obtain priority access to the radio channel at the access point using the PIFS.

4. The method according to claim 1, wherein said step comprises the substeps of retention: a transmission opportunity granted to the access point and the one of the station.

5. The method according to claim 4, wherein the transmission opportunity includes a time period during which the access point and the station transmits one of a group of data packets through the radio channel.

6. The method according to claim 5, wherein the time period is determined according to the number of the set of data packets in the packet.

7. The method according to claim 5, wherein the period of time represented by the duration field of the data packet transmitted by the access point.

8. The method according to claim 1, wherein said step (a) to (e) is performed during the contention.

9. A method for wireless communication, the method comprising: (a) when addressed to the radio station has a wireless access point of the first data packet, the communication station switches from the first mode to the second communication mode, the station only when it is in said second mode to receive and transmit data packets to at least one of the first mode to the power saving mode; (b) when the station has available radio channel, by the station by using the radio channel to the access point transmits the first data packet; (c) by the access point receives the first data packet; (c) by the access point station sends an acknowledgment to the packet, the acknowledgment packet indicating that the access point receives the first packet and one of the following: (1) addressed to the present station and the second packet (2) a second packet addressed to the station is not present; (d) if (1) indicating the presence of said acknowledgment packet and the second packet (2) of the station to the access point has addressed other establishment of a data packet, performing the following sub-steps: (i) obtaining priority access to the radio channel by the access point; (i i) after sub-step (i), by the access point of the radio channel reserved for wireless communication between the access point and the station; and (iii) the radio channel through the wireless communication between the access point and the station; and (e) upon termination condition is satisfied, the station will be switched to the first mode.

10. The method according to claim 9, wherein, when said acknowledgment packet indicating the absence of the second data packet, the acknowledgment packet includes null data field.

11. The method according to claim 10, wherein said termination condition is one of the following: (a) the service period ends with the packet indicator, (b) acknowledgment packet with an empty data field , (c) a predetermined time expires, and transmitting a predetermined number of data packets (d) between the station

and the access point.

12. The method according to claim 9, wherein the priority radio channel access is obtained when using PIFS the access point.

13. The method according to claim 9, wherein said sub-step comprises the sub-steps Reserved: a transmission opportunity granted to (1) the access point and (2) a station.

14. The method according to claim 13, wherein the transmission opportunity includes a time period during which the access point and the station transmits one of a group of data packets through the radio channel.

15. The method according to claim 14, wherein the time period is determined according to the number of the set of data packets in the packet.

16. The method according to claim 14, wherein the period of time represented by the duration field of the data packet transmitted by the access point.

17. The method according to claim 9, wherein said step (a) to (e) is performed during the contention.

18. A system, the system comprising: a wireless station; and the station in communication with the wireless access point; wherein the schedule table in accordance with a predetermined communication mode switching from a first to a second communication mode, the table only when it is in said second mode to receive and transmit data packets to at least one of said first mode is a power saving mode when the station is in the second mode, the access point given priority access to the radio channel of the access point of the radio channel reserved for wireless communication between the access point and the station, the radio communication through the radio channel in the access carried out between the point and the station, and upon termination condition is met, i.e., the station switches to the first mode.

19. A system, comprising: a wireless station; and a wireless access point of the communication station, wherein said radio station having a first communication mode from a first data packet addressed to the access point switching to the second communication mode, the station can be performed only when it is in said second mode and transmitting the received packet data in at least one of said first mode is a power saving mode when the station has available radio channel when the station using the radio channel transmits the first packet to the access point, the access point receives the first data packet acknowledgment to the transmitting station, the acknowledgment packet indicating said access point receives the first packet and one of the following, namely (1) the presence of a second station addressed to the packet and (2) the absence of a second station addressed to said data packet , if one of the following is satisfied, i.e., (1) indicates the presence of said acknowledgment packet and the second packet (2) of the station has further data packet addressed to the access point, then (i) the said access point to obtain access to the priority radio channel and (ii) retaining the radio Channels for wireless communication between the access point and the station and for wireless communication, and upon termination condition is satisfied, the station switches between the access point and the station via the radio channel to the first mode.

Description

translated from Chinese

For battery saving system and method in a wireless station

US provisional patent application claims priority to the requirements of the August 5, 2004, filed, entitled "(Automatic Power Save Delivery 802.11e network) Automatic Power-Save Deliveryin 802.11e Networks" Application Serial No. 60 / 599,142 of priority. The entire disclosure of this application is regarded as the front part of the disclosure of the accompanying application, and expressly incorporated herein by reference.

Background Many wireless station ("STA") (eg, a cellular phone, PDA, scanner, laptop computers, handheld PC, etc.) to wirelessly connect to the Internet, such as a LAN, Intranet and other computer networks. Thus, the STA without any wired connection can achieve its function. Typically use batteries to power the STA to herein, as they can provide absolute freedom of movement to its users. Alternatively, the power adapter may be used with the STA power electrical outlet. However, this method requires the use of cord fixed to STA tethered to a power supply, which reduces the mobility and practicality. Thus, to maintain the mobility of the user and reduce power consumption of the STA and the manufacturer's primary concern.

When the STA is connected to a network access point ("AP") generally to wireless communications using known communication protocols (e.g., IEEE 802.11 standard). Recognizing the power consumption and battery life is very important for users and manufacturers of the STA, the 802.11 standard includes a power saving mechanism. To be transmitted to STA packets are buffered at the AP According to these mechanisms, the STA is in sleep mode (i.e., power saving mode). Once the wake-up from sleep mode, AP will send the buffered data packet to the STA. Thus, the STA need not be in a permanent awake mode (i.e., battery power consumption) can receive data packets.

For real-time applications is expected to have a quality of service ("QoS") requirements (eg, VoIP, video streaming, etc.), the development of the 802.11e standard to support these applications. The reaction requires the ability QoS STA and the AP providing a consistent packet delivery to ensure a certain degree. 802.11e standard is also provided by an automatic power save delivery mechanism for saving ("APSD"). Using APSD, two types of service time period is possible: non-scheduled (unscheduled) and schedule (scheduled) a. Non-scheduled service period is only using the enhanced dispersion channel access ("EDCA") access channel QoS- enhanced wireless station ("QSTA") defined. The scheduled service period is defined using EDCA QSTA or hybrid coordination function ("HCF") channel access ("HCCA") controlled. However, the 802.11e standard for the two service time period and the scheduling and non-scheduling, the QSTA is awake for a longer time, because it must contention access as a medium for transmission of wireless radio channel. Although standard 802.11e APSD intended to reduce power consumption, but the requirements of the AP and QSTA contention access channel may have side effects such as increased battery power consumption, resulting in a delay jitter, and / or increasing the system overhead.

Battery saving in a wireless station used in the system and method according to the present invention Summary of the invention. First, the radio station according to a predetermined schedule, switching from the first communication mode to the second communication mode. The station only data packets transmitted and received at least when it is in a second communication mode. The first mode is a power-saving mode. When the station is in the second mode, the wireless access point to obtain access to the priority radio channel. Then, the access point of the radio channel reserved for wireless communication between the access point and the station. Wireless communication between the access point and the station via the radio channel. A termination condition is satisfied, i.e., the station switches to the first mode.

In another exemplary embodiment, when the wireless station has a first data packet addressed to the wireless access point, the station switches from the first communication mode to the second communication mode. The station only data packets transmitted and received at least when it is in a second communication mode. The first mode is a power-saving mode. When the station has available radio channel, the station by using the radio channel data packet to the first access point. The access point receives the first data packet. The access point transmitting the acknowledgment packet to the station. Acknowledgment packet indicating that the access point receives the first packet and one of the two, i.e., (1) presence and (2) the absence of a second packet addressed to the station. If both of the following one, i.e., (1) a second acknowledgment packet indicating the presence of packet data and (2) also sets the packet addressed to another access point, the access point is given priority access to the radio channel into. Then, the access point of the radio channel reserved for wireless communication between the access point and the station. Wireless communication between the access point and the station via the radio channel. Upon termination condition is satisfied, the station switches to the first mode.

BRIEF DESCRIPTION Figure 1 illustrates an exemplary wireless network according to one embodiment of the present invention; Figure 2 shows a conventional automatic power save delivery schedule ("APSD") a schematic representation of the mechanism; Figure 3 shows a a schematic representation of an exemplary embodiment of the present invention is enhanced APSD scheduling mechanism; FIG. 4 shows a scheduling an enhanced APSD method of the present invention to an exemplary embodiment;

FIG. 5 shows a schematic of the conventional non-scheduled APSD mechanism is represented; FIG. 6 shows a schematic representation of an exemplary embodiment of the reinforced invention Unscheduled APSD mechanism; FIG. 7 shows a further exemplary scheduling mechanism of a conventional non-APSD representation; FIG. 8 shows a schematic representation of a further exemplary embodiment of the present invention is enhanced Unscheduled APSD mechanism; FIG. 9 shows an enhancement according to the present invention exemplary type Unscheduled APSD embodiment of the method.

DETAILED DESCRIPTION The present invention, in the drawings by the same reference numerals represent the same elements by reference to the following description and drawings may be further understood. Embodiments of the invention relate to the STA (e.g., a cellular phone, PDA, a bar code scanner, a laptop computer, a handheld PC, etc.) with improved energy-saving mechanism, in particular, to the 802.11 standard (e.g., 802.11e) in automatic power save delivery ("APSD") mechanism used. Improved herein STA may reduce battery power consumption, reducing the jitter, and scheduling services to reduce the particular application with the specified characteristics (e.g., VoIP, video streaming, etc.) of the protocol overhead.

FIG 1 shows an exemplary embodiment of a system according to the present invention is 5. The system 5 may include a connection to an access point ("AP") 15 of the communication network 10. Communication network 10 may be connected to the server 12. AP 15 may communicate wirelessly with the wireless switch architecture may use any of a plurality of radio stations (e.g., a cellular phone, a laptop computer, a handheld PC, printer, headphones, etc.). The 15, a wireless station ("STA") 20 and another STA 25 with reference to the present invention will be described with AP. As will be known to those in the art will appreciate, the system 5 may comprise any of a plurality of AP and STA.

AP 15 and STA 20,25 may operate in accordance with conventional standards, such as IEEE 802.11 wireless communication protocol. In a preferred embodiment, the 802.11 standard 802.11e standard 802.11 network (i.e., a wireless local area network ("WLAN")) to achieve quality of service ("QoS") of the. As those skilled in the art will appreciate, QoS data by allowing a higher priority given priority access to the radio channel 10 used by the network to modify the access rules 802.11. Thus, high priority data may be granted (e.g., VoIP, streaming video, etc.) in preference to lower priority data (e.g., e-mail, web pages, etc.) access channel.

According to the invention, STA 20 may have a STA 20 wherein saving data (i.e., does not transmit / receive data) in a first communication mode (i.e., "sleep" mode), and where it is, or may be ready to send or receive the a second communication mode (i.e., "wake up" mode). STA 20 according to the protocol scheduling and non-scheduling service period to switch between the sleep mode and the awake mode. 20 is when the STA is awake, it can AP 15 and / or another STA 25 packets transmitted from the AP 15 and / or another STA 25 and to receive packets. However, in the sleep mode, the STA 20 originally is in the awake mode in case of transmitting data from STA 20 to the AP 15 packets are buffered in the AP 15. Thus, when the service period begins, STA 20 is switched into the awake mode and receives the packet that is buffered. However, the conventional 802.11 access rules require longer held STA 20 can send and receive data packets in the awake mode, resulting in increased efficiency and reduced the STA 20 used in the battery system traffic.

To save battery, 802.11e standard defines a conventional automatic power save delivery ("APSD") mechanism, wherein if another STA 25 packets being sent over a channel, the AP 15 must wait for data packets to the transmitting STA 20. Accordingly, AP 15 must wait a random amount of time (e.g., "retracted (backoff)") and until the channel is idle before transmitting to the STA 20 packets. The STA 20 leading to the waiting time for a longer time in the awake mode, thereby increasing its power consumption and potentially increases system overhead (e.g., traffic channel).

Conventional scheduling APSD mechanism FIG. 2 illustrates the use of an enhanced dispersion channel access ("EDCA") mode 200. As is well known in the art, 802.11e standard defines a new coordination function, i.e., for use in an enhanced QoS basic service set ("QBSS") in the hybrid coordination function ("HCF"). HCF has two operating modes, EDCA mode and HCF Controlled Channel Access ("HCCA") mode. EDCA mode of operation is based on the contention channel access contention function. Portion of the time period is contention between the beacon transmitted by the AP (or all). In the contention period, the wireless station (e.g., STA, and AP) using a channel access mechanism (e.g., the EDCA mode dispersion coordination function ("DCF"), the point coordination function ("PCF"), with collision avoidance carrier sense multiple access ("CSMA / CA")) to contention channel access.

When all of the contention between the time of the beacon is not, the remainder of the time between beacons is contention-free period. In the contention free period, the STA by the coordinator at the access point (e.g., point coordinator, hybrid coordinator) polling. When polled, STA can communicate with the AP without contention channel access. Thus, the EDCA and HCCA mode may run mode (e.g., between the same beacon period). As is well known in the art, EDCA and HCCA mode and enhanced mode extends the original access methods --DCF and PCF functions.

As shown, in the contention period, the conventional scheduling APSD mechanism 200 uses AP 205, STA 210 and another STA 215 2. Although the use of in operation will contention (e.g., using EDCA mode) of the present invention will be described, those skilled in the art will appreciate that various aspects of the invention may be applied to a contention-free period in operation (e.g., using HCCA mode).

As those skilled in the art will appreciate, AP 205 and STA 210 may be enhanced QoS, and hereinafter referred to as QAP 205 and the QSTA 210. STA 215 may be further enhanced QoS. Although the composition of the mechanism 200 will be described in accordance with standard 802.11e QoS, those skilled in the art will appreciate that the present invention may also be used for the other versions of the 802.11 standard (e.g., 802.11a, 802.11b, 802.11g, etc.) network used.

200, start the service time in the service start time ("SST") 220 according to the conventional schedule APSD mechanism. In the conventional scheduling APSD mechanism 200, SST 220 a predetermined agreement between the QAP 205 and the QSTA 210 based. SST 220 represents QSTA 210 should switch from the sleep mode 225 to the awake mode 230. SST 220 may be present on, for example, intervals of 30 ms. As those skilled in the art will appreciate, QSTA 210 may be predetermined prior time SST 220 SST 220 or 230 into the awake mode.

However, as shown in FIG. 2, the SST 220, since the other QSTA 215 or any other STA packet is being transmitted on the channel 235, so that the channel is busy. Since the channel is busy, the QAP 205 will wait until the channel is idle. As those skilled in the art will appreciate, if the SST has been idle the channel 220 (i.e., on which no transmission), the QAP 205 without waiting to send. However, after detecting the channel is busy, a backoff start 240 QAP 205, the QAP 205 therebetween random value from the timer countdown. When the countdown, QAP 205 continually reassess the channel and, when idle, QAP 205 corresponding to each idle channel decreasing slot timer. 2, the backoff duration 240 may be a random value that is decremented to zero before another QSTA 215 or any other STA 245 may transmit a second data packet on the channel, since the QSTA 215 or any other timing STA reaches zero before the end 240 retracted. When the QAP 205 in the limp-240, QSTA 210 230 remain in the awake mode. If the channel is busy, the QSTA 210 may be held longer in the awake mode 230, and always consumes battery power.

As long as the channel remains busy, QAP 205 may undergo further retracted, so that each time both increase the random backoff value. When the channel is idle, QAP 205 the buffered data packets 250 sent to the QSTA 210. Those skilled in the art will appreciate that the buffered data packet 250 may comprise one or a plurality of buffered data packets and a packet service time period should have arrived.

As those skilled in the art will appreciate, QSTA 210 may, after receiving the data packet 250 after waiting for a short inter-frame space ("SIFS") sends an

acknowledgment ("ACK") 260 to the QAP 205. If the QSTA 210 265 To a packet is transmitted QAP 205 and the channel is busy again, the QSTA 210 in the transmission data packet 265 must be performed before a retracted 270.

After QSTA 210 transmits the packet 265 to the QAP 205, QSTA 210 waits for ACK QAP 205 275. Response similar to the response from the QAP 205 QSTA 210 performs. After the QAP 205 transmits ACK 275, QAP 205 may not transmit other packets To QSTA 210, or may intend QAP205 terminate the service period. In either case, QAP 205 transmits a null data packet 190 to the QSTA 210 indicates the end of service period ("EOSP"). Packet may include null data EOSP indicator 290, which may be null data packet control field 290 (e.g., QoS packet) (e.g., QoS Control field) in the bit values. If the QAP 205 attempts to transmit null data packet 290 when the channel is busy, the QAP 205 may perform 285 a second retraction. QSTA 210 responds with ACK 295 290 null packets. After receiving the ACK 295 and an indicator EOSP to a QAP 205, QSTA 210 return to the sleep mode 225.

In an embodiment of a conventional APSD mechanism 200 shown in FIG. 2, since the retraction 240,270,285 QAP 205 and the QSTA 210 to access channel that must be performed, so that a relatively long time QSTA 210 in the awake mode 230. Awake mode 230 in a substantial portion, QSTA 210 are waiting for transmission from the QAP 205 or waiting to be sent to the QAP 205. Thus, QSTA 210 waiting in inefficient transmission / reception of packets while more and more energy consumed. In addition, send an empty packet to terminate the service of the 290 system may increase overhead and reduce bandwidth utilization.

As shown in FIG. 3, the present invention provides an enhanced scheduled APSD mechanism 300. Enhanced APSD mechanism 300 may schedule the system shown in FIG. 1 assembly 5 used in the contention period. That is, the enhanced APSD mechanism 300 may QAP 305, QSTA 310 use and / or other QSTA 315. Accordingly, the present invention can be protocols such as 802.11 (e.g., 802.11a, 802.11b, 802.11g, 802.11e), the other for multimedia applications (e.g., the VoIP) and / or asset tag low power applications (e.g., low power 802.11 RFID tag implementation on) to provide QoS and / or saving protocols supported wireless network. As will be known to those in the art will appreciate, the present invention may be EDCA mode Unscheduled APSD, and EDCA and / or HCCA mode using APSD schedule.

In one exemplary embodiment of a reinforced scheduled APSD mechanism 300, QAP 305 and the QSTA 310 agree (e.g., SST 330) to start the service in accordance with a predetermined time schedule. Or before the SST 330, QSTA 310 320 switched from the sleep mode to the awake mode 325. As shown in FIG. 3, since the other QSTA 315 packet 335 is transmitted on the channel, so that the channel is busy. As will be transmitted, subject to any activity known to those in the art will appreciate, the data packet 335, or the channel is not enhanced APSD mechanism 300 scheduling work. That is, regardless of whether the channel is busy you can use the enhanced scheduling APSD mechanism 300.

According to the present invention, QAP 305 by using the point coordination function ("PCF") inter-frame space ("PIFS") 340 to obtain priority access to the channel. PIFS 340 QAP 305 may be used to gain access to the channel before any other QSTA, because the duration is shorter than PIFS 340 any any QSTA retracted performed. That is, PIFS 340 QAP 305 allows the channel priority over other QSTA. PIFS 340 provided with Priority, QAP 305 may be the only device that can be transmitted on the channel. Thus, QAP 305 the buffered data packets 345 sent to the QSTA 310. As described above, the data packet buffer 345 may include a plurality of buffer packets and / or for a data packet to the QSTA 310.

QSTA 310 may gain access to the channel using SIFS 350 before sending the data packet and / or ACK to the QAP 305. SIFS 350 QSTA 310 may allow access to any other channel before the QSTA, as SIFS 350 duration than any other of the latency (e.g., retracted) is shorter. As described above with respect to the conventional scheduling APSD mechanism 200, QSTA 310 will have to perform transmission backoff before to get access to the channel, thereby extending the time in the awake mode 325.

According to the present invention, QAP 305 may reserve the channel is only used for communication between the 310 and its QSTA. QAP305 example transmit opportunity ("TXOP") assigned to a reserved channel. TXOP may be reserved transmission QAP and / or the QSTA 310 communicating with an amount of 305 times or for a certain number of times. As will be known to those in the art will appreciate, QAP 305 may begin at the service period (e.g., SST 330) time, and / or in the case of ACK from the QSTA 310 show QSTA 310 is waiting to send a packet TXOP . If the QSTA 310 is not waiting to send a data packet, as discussed below, a termination condition is met it will return to the sleep mode 320. In another embodiment, shown in Figure 3, it may be bundled ACK packet and 255. That is, data packets may be piggybacked on the ACK, which is in the awake mode 325 can reduce time and reduce system overhead. Those skilled in the art will appreciate that, for each data packet -ACK composition with respect to the present invention can be burdened.

Termination condition may be indicative of the service or to end the period has ended, and the QSTA 310 should switch the sleep mode 320 events and / or conditions. Termination condition may have a plurality of exemplary embodiments. In a first exemplary embodiment, the termination condition may be a predetermined agreement between the QAP 305 and the QSTA 310 on the end of the service period. The agreement may reflect, for example a predetermined duration (eg, 50ms) service expiration of the time period. In another exemplary embodiment, the termination condition may be received ACK (e.g., ACK 360) having a null data field. That is, the ACK frame 360 in the "More Data" field may include an indication wireless station (e.g., QAP 305) is not a bit value of other data packets to be transmitted (e.g., 0). Thus, upon receiving the ACK 360, QSTA 310 to send any data packets and / or having 320 to switch to the sleep mode. In yet another exemplary embodiment, the termination condition may be EOSP indicator is set to the bit value (e.g., EOSP = 1) packet. As those skilled in the art will appreciate, EOSP indicator may be included in the data packet or an empty data packet. In another exemplary embodiment, the termination condition may represent a predetermined number of times of transmission (e.g., a predetermined protocol). For example, QAP 305 may be a first data packet to the QSTA 310, and the QSTA 310 may transmit a second data packet to the QAP 305. After this exchange, QSTA 310 320 can be switched to the sleep mode. Those skilled in the art will appreciate that the transmission comprises a predetermined number of times of transmission from the QAP 305 any number of times and / or the QSTA 310.

A further exemplary embodiment of the termination condition is that the data packet has a special meaning. For example, a user may perform transactions using a particular application (e.g., inventory detection). Once the transaction is terminated, the application can generate the "Transaction end" packets. Upon receiving the "End Transaction" packet, QSTA 310 to switch 320 to the sleep mode. In another embodiment, for a web browsing application, QSTA to indicate that the receiver 310 can be switched to the sleep mode QSTA 320. "& lt; / body & gt; & lt; / html & gt;" end of packet. In the exemplary embodiment, for example, If the QAP 305 and 310 formed QSTA dedicated communication protocol, the data packets generated by the QAP 305 or 310 is being generated by the QSTA 310 to the QSTA another QSTA communication therewith.

As shown in the exemplary embodiment of a reinforced scheduled APSD mechanism 300 in response to a data packet from the QSTA 310 and ACK 355, QAP 305 may include a frame control field of the transmit ACK 360. As described above, the frame control field includes a "More Data" field. Thus, ACK 360 in the "More Data" field includes information indicating whether there QAP 305 (e.g., termination condition) data packets to be transmitted to other bit values of the QSTA 310. In this manner, QSTA 310 receives ACK 360 as long without having to receive a packet with EOSP null indicator 320 can return to the sleep mode. As described above for the exemplary embodiment of the termination condition, for example, If termination of the service based on a predetermined period of time and / or after a predetermined number of times transmission data packets (e.g., a predetermined protocol), the QAP 305 may not transmit null data package. According to a predetermined protocol (e.g., VoIP), QSTA 310 can know each service period QAP 305 transmits a predetermined number of data packets. Upon receiving a predetermined number of data packets, QSTA 310 receives the null data packets without the need to return to the sleep mode 320. Without having to empty packet service time period from 3 to packets (FIG. 2) is reduced to two data packets (FIG. 3). Packets can be optimized to reduce power consumption, bandwidth utilization, and reduce jitter (i.e., a signal caused due to poor synchronization / image distortion).

FIG 4 illustrates an enhanced 400 according to an exemplary scheduled APSD method of the present invention, and below with reference to FIG. 3 to its composition will be described. In step 405, QSTA 310 according to a predetermined schedule (e.g., 330 or prior to the time agreed SST) wakeup.

In step 410, QAP 305 obtains a channel access. As described above, QAP 305 may be, for example, as described above PIFS 340 to obtain priority access to the channel by using. In this manner, the limp QAP 305 may not be required prior to obtaining channel access. By obtaining priority access, QAP 305 may start to send the QSTA 310. Thus, in a preferred embodiment, the service period starts (e.g., in the SST 330), QAP 305 will get access to the channel QSTA 310 transmits the packet.

In step 415, QAP 305 transmits a packet to the QSTA 310. If the QAP 305 has buffered data packet 345, the packet buffer 345 is transmitted to the QSTA 310. If the QAP 305 is not buffered packet 345, the QAP 305 may QSTA 310 will send a null packet. Those skilled in the art will appreciate that, QSTA 310 receives the null packet may indicate to the QSTA 310: QAP 305 has no buffered data packets to be sent to the QSTA310. Using TXOP, as shown, QAP 305 to step 428 to send another packet QSTA310.

In step 420, the QAP 310 determines whether a packet to be transmitted to another QSTA 310. If the QAP 310 is no more data packet, the method proceeds to step 430. If the QAP 305 has further data packets to be sent to QSTA 310, then as shown in step 425, QAP 305 itself may be granted TXOP. As those skilled in the art will appreciate, TXOP may be reserved channel for transmitting the QAP 305. Thus, TXOP duration may have, for example, with the number of other packets varies.

In step 430, it is determined whether the QSTA 310 has a packet to send. If no packets QSTA 310, the method proceeds to step 445. If the QSTA 310 has a data packet, as shown in step 435, QAP 305 may grant QSTA 310 TXOP. As described above, the TXOP granted QSTA 310 may have a duration of over 310, for example, the number of packets at the QSTA varies. As those skilled in the art will appreciate, it may be sent in response to a packet transmitted in step 415 to the QAP ACK 305 in the notification indication QAP 305: QSTA 310 data packets. For example, after receiving a packet from the QAP 305, the ACK from QSTA310 may indicate (e.g., by a bit value of the ACK field) QSTA 310 whether there is data packet. Thus, QAP 305 may grant ACK from the QSTA 310 TXOP according to the QSTA 310.

In step 440, QSTA 310 sends the data packet to the QAP 305. Transmitting the transmission one exemplary embodiment, a separate ACK packet transmitted to the QSTA 310. In another exemplary embodiment, the packets are piggybacked ACK 355 and send bundled form. In this embodiment, ACK, and / or data packet may comprise other QSTA 310 whether the packet to be transmitted to indicate the QAP 310. Thus, the TXOP granted QSTA 310 may transmit the results of ACK and / or data packet to the QAP 305. As will be known to those in the art will appreciate, the step in which the QAP 305 and the QSTA 310 and 415 are each transmitted packet 440 allow all data packets are transmitted before the next appropriate step in the method 400 continues.

In step 445, it is determined whether a termination condition is reached. It has been discussed above exemplary embodiments termination condition. Thus, for example, transmission termination condition when a predetermined number of times, QAP 305 may have sent a first packet in step 415, and the QSTA 310 may have sent a second data packet in step 440. In this example, the predetermined number of times of transmission may be transmitted (e.g., QAP 305 and vice versa to QSTA 310) each to the primary. QSTA 310 after transmitting a second data packet (received from the QAP 305 and the ACK 360), as shown in step 450, QSTA 310 may enter a sleep mode switch 320. As will be known to those in the art will appreciate, the method 400 may comprise any one of these exemplary embodiments in the termination condition.

FIG 5 shows a conventional non-scheduled APSD mechanism 400. As those skilled in the art will appreciate, conventional non-scheduled APSD mechanism 400 in the QSTA 410 420 a packet is to be sent to the QAP 405 startup. Therefore, QAP 405 and the QSTA 410 is not like that on the service start time in the schedule APSD in agreement.

5, 500, the service time period in accordance with the conventional handover QSTA 510 Unscheduled APSD mechanism 540 to the awake mode is started, the data packet 520 because it has to be transmitted to QAP 505. However, at the beginning of the service channel of another QSTA 515 is transmitting data packet 525. Thus, QSTA 510 530 necessary to perform a backoff. 530 during retraction, the other QSTA 515, other QSTA or QAP 505 may have sent a packet on the channel 555.

After the backoff 530 and the channel has been idle, QSTA 510 transmits data packets 520 to the QAP 505. Upon receiving the data packet 520, QAP 505 that is waiting SIFS 560 and QSTA 510 transmits ACK 565. If the QAP 505 going to the QSTA 510 transmits buffered data packet 570, the QAP 505 must perform backoff in the channel 535 is busy. Those skilled in the art will appreciate that, QAP channel is busy at the QSTA 510 and 505 may attempt to send each data packet (or a retransmission) performs backoff. As described above, the large retraction will extend the service period, and thus extend the time QSTA 510 in the awake mode 540. Upon receiving the data packet buffer 570, QSTA 510 ie QAP 505 transmits ACK 575.

After sending the packet buffer 570, QAP 505 may want to end the service period. However, according to conventional Unscheduled APSD mechanism, QAP 505 must send data packets with EOSP indicator 550 (or empty packet) to inform the QSTA 510 the service period is terminated. Thus, QAP 505 will re-acquire the access channel, which may include performing another 580 retracted. After the QAP 505 to re-access channel data packet 550 is transmitted to the QSTA 510. EOSP indicator data packet 550 indicates that the service period ends, and the QSTA 510 after sending ACK 585 to the QAP 505 545 should be switched to the sleep mode.

FIG 6 illustrates an exemplary embodiment of Unscheduled APSD mechanism 600 according to the present invention is enhanced. Service time period QSTA 610 635 a packet is to be sent to the QAP 605 and 620 is switched from the sleep mode to the awake mode 625 starts. However, as shown in FIG. 6, when 625 QSTA 610 enters the

awake mode, since the other QSTA 615 (or QAP 605) the data packet is sent over the channel 630, so that the channel is busy. Thus, QSTA 610 before sending the data packet to the QAP 605 635 640 retracted performed. As those skilled in the art will appreciate, if the QSTA 610 enters into the awake mode 625 when the channel is idle, then the QSTA 610 may need to perform 640 retracted.

When the channel is idle, QSTA 610 sends the packet 635 to the QAP 605. Upon receiving the data packet 635, QAP 605 that is waiting SIFS 645 and thereafter transmits ACK 650. PIFS 655 QAP 605 is then used to obtain priority access channel. As shown in FIG 6, QAP 605 has buffered data to transmit to the QSTA 610. As described above, in the use of PIFS 655 obtains a channel access, QAP 605 may be granted TXOP for itself the communication channel reserved for the QAP 605. In this manner, QAP 605 the buffered data packets 660 sent to the QSTA 610, and 660 receives each of the buffer the received data packet to the QSTA 610 corresponding to the ACK 665. As will be known to those in the art will appreciate, QAP 605 may grant QSTA 610 TXOP, because the packet 635 QSTA 610 may indicate other data packet 635 to be sent to the QAP 605. May be granted a TXOP QSTA 610 before sending a reserved channel buffered in the QAP 610 or after the data packet.

After receiving the ACK 665, QAP 605 may wait a SIFS 670 before sending another packet 675. If another packet 675 that is sent to the last packet 610 QSTA, the QAP 605 may include EOSP therewith an indicator (e.g., a termination condition). Thus, after receiving this packet 675 with EOSP another indicator, QSTA 610 transmits ACK 680 and switch 620 enters the sleep mode.

FIG 7 shows a case where another conventional Unscheduled APSD mechanism QAP 705 is not buffered packet 700. QSTA 710 720 switched from the sleep mode to the awake mode 725 and backoff 730 (e.g., since the other QSTA 715 is transmitting data packet 735) the access channel. In the limp-730, and after detecting the channel is idle, QSTA 710 transmits a data packet 740. Upon receiving the data packet 740, QAP 705 that is waiting SIFS 745 and QSTA 710 transmits ACK 750. In Figure 7, QAP 705 does not have any buffering packets to be sent to QSTA 710, and an empty packet 755 this case communicated to QSTA 710. However, if the channel is busy, the QAP 705 before sending the null data packet 755 must perform a backoff 760. EOSP QAP 705 can be provided in an empty packet indicator 755 to indicate that the service period should be terminated. Upon reception of the null packet 755, QSTA 710 transmits i.e. ACK 765 and 720 switch back to the sleep mode.

8, according to the present invention, the enhanced APSD mechanism Unscheduled another exemplary embodiment 800 of the exemplary embodiment significantly reduces the QSTA 810 remain in the awake mode 825 and reduces the time a conventional Unscheduled APSD mechanism 700 since introducing an empty data packet 715 system overhead. In the enhanced mechanism 800, the QSTA 810 840 a packet is to be sent to the QAP 805 begins when the service period, QSTA 810 and 820 is switched from the sleep mode to the awake mode 825. QSTA 810 tries to send data packet 840 to the QAP 805, but the channel is busy (e.g., another QSTA 815 is

transmitting data packet 835). And after performing the backoff 830 detects the channel is idle, QSTA 810 sends the packet 840 to the QAP 805. As shown in FIG 8, QAP805 QSTA 810 not to send to the packet buffer. If the QSTA 810 indicates (e.g., by a bit value of the frame field) which has a further data packet to be sent to the QAP 805, the QAP 805 may grant QSTA 810TXOP, whereby the channel is reserved for the QSTA 810.

If the packet 840 is the only transmission (e.g., the QSTA 810 packets only) 810 from the QSTA, the QAP 805 may wait a SIFS 845 and the QSTA 810 transmits ACK 850. Exemplary embodiment described above with reference to terminating the condition, ACK 850 (as well as packet 840) may include a frame control field, a frame control field can include a "more data" field. According to an exemplary embodiment of the present invention, a "More Data" field may be set to represent QAP 805 (or QSTA 810) no data packets (with or without other packets) to be transmitted value (e.g., 0). Thus, upon receiving the ACK 850, QSTA 810 may switch 825 from the awake mode 820 to the sleep mode. Accordingly, in one exemplary embodiment, for example, and the indicator value EOSP null packets available ACK 850 "More Data" field instead. Those skilled in the art will understood that with any one of exemplary embodiments using the above-described termination conditions.

Figure 9 shows an enhanced according to the present invention Unscheduled APSD exemplary method 900, and illustrated below with reference to the enhanced APSD mechanism 6 Unscheduled 600 of FIG its composition will be described. In step 905, the service period due to the QSTA 610 data packet 635 to be sent to the QAP 605 and into the awake mode 625 starts. In step 910, QSTA 610 access channels. As described above, if the channel is busy, the QSTA 610 must perform a backoff 640 and waits until the channel is idle before transmitting. In step 915, QSTA 610 transmits data packets 635 to QAP605.

In step 920, the QAP 605 determines whether the packet buffer 660 to be transmitted to QSTA 610. If the QAP 605 is not buffered data packet 660, then the method proceeds to step 940. If the QAP 605 packet buffer 660, the QAP 605 may be used PIFS 655 to obtain priority access channel, as shown in step 925. In step 930, QAP 605 itself granted TXOP, and at step 935, QAP 605 packet data transmit buffer 660 to the QSTA 610. When the QAP 605 reserved channel, it may send another data packet 675 to the QSTA 610.

In step 940, it is determined whether the QSTA 610 to send other packets. If no other data packets QSTA 610, the method proceeds to step 955. If the QSTA 610 other packets to send, then as shown in step 945, QAP 605 may grant QSTA 610 TXOP ,. As described above, packets 635 and / or the ACK 665 may indicate to the QAP 605 QSTA 610 comprise other packets to send. In step 950, QSTA 610 transmitting these other data packets.

In step 955, termination condition is reached. As those skilled in the art will appreciate, QAP 605 and QSTA610 send packets back and forth until a termination condition is reached. As described herein, the termination condition may be the above-described exemplary embodiments, any one or combination. After the termination condition has been reached, as shown in step 960, QSTA610 625 is switched from the awake mode 620 to the sleep mode. As those skilled in the art will appreciate, before switching to the sleep mode 620, QSTA 610 may send ACK 680 to the QAP 605.

The present invention has been described with reference to the QAP, QSTA and termination conditions. Accordingly, various modifications and changes may be made to these embodiments without departing from the broadest spirit and scope of the invention as set forth in the appended claims. Accordingly, the description and drawings to be considered in an illustrative rather than a restrictive sense.

Cited By (6)

Publication number	Priority date	Publication date	Assignee	Title
WO2012058996A1 *	2010-11-02	2012-05-10	中兴通讯股份有限公司	Method and system for switching operation modes in a backward compatible large bandwidth wireless network
CN102474820A *	2009-08-07	2012-05-23	Nec欧洲有限公司	Method for operating a mobile terminal as access point and corresponding mobile terminal
CN103229562A *	2011-01-25	2013-07-31	三星电子株式会社	Transmission apparatus, reception apparatus, and communication method
CN104186002A *	2011-12-27	2014-12-03	高通股份有限公司	Methods and apparatus for improving nfc llcp partitioning
TWI478550B *	2011-06-07	2015-03-21	Htc Corp	Method of back-off procedure setup in a wireless communication system
CN104735757A *	2015-03-27	2015-06-24	珠海全志科技股份有限公司	Method for improving frame extraction efficiency of STA equipment

Family To Family Citations

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
US7110783B2	2006-09-19	Power efficient channel scheduling in a wireless network
US7085595B2	2006-08-01	Power saving in a wireless local area network
US20130235720A1	2013-09-12	Supporting a large number of devices in wireless communications
US7551948B2	2009-06-23	Uniform power save method for 802.11e stations
US7711093B2	2010-05-04	Method and system for power saving in wireless local area communication networks
US20050136914A1	2005-06-23	Power management method for creating deliver opportunities in a wireless communication system
US20100008274A1	2010-01-14	Power save enhancements for wireless communication devices
US20090279464A1	2009-11-12	Power save mechanism for wireless communication devices

US20090232042A1	2009-09-17	Wireless network including post groupcast time
US20100271995A1	2010-10-28	Procedure for a power save mode in a direct link setup wireless network
US20070238438A1	2007-10-11	Learning mechanism to configure power save parameters for automatic power save delivery
US7324468B2	2008-01-29	System and method for medium access control in a power-save network
US20070161364A1	2007-07-12	Method and apparatus for scheduling in a wireless communication network
US7412266B2	2008-08-12	Method and system for power-saving in a wireless local area network
US20050237984A1	2005-10-27	Organization of automatic power save delivery buffers at an access point
US20110122780A1	2011-05-26	Graceful Wakeup Of Power Saving Communication Apparatuses
US20070293218A1	2007-12-20	Collision avoidance for traffic in a wireless network
US20080130603A1	2008-06-05	Systems and methods for coexistence of wlan and bluetooth networks
US20060252449A1	2006-11-09	Methods and apparatus to provide adaptive power save delivery modes in wireless local area networks (LANs)
US7668128B1	2010-02-23	Features of power save in 802.11e wireless local area networks (WLANs)
US7733883B2	2010-06-08	Method and system for reducing power consumption of a wireless transmit/receive unit
US20120263086A1	2012-10-18	Reducing power consumption in a wireless communication system
Tsao et al.	2011	A survey of energy efficient MAC protocols for IEEE 802.11 WLAN
US20110158142A1	2011-06-30	Method and system for power management in an ad hoc network
US20080101320A1	2008-05-01	Method for actively synchronizing U-APSD service periods

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
US59914204P	2004-08-05	2004-08-05	*US Provisional Application*

Legal Events

Date	Code	Title	Description
2007-09-12	C06	Publication	
2007-11-07	C10	Request of examination as to substance	
2011-03-23	C02	Deemed withdrawal of patent application after publication (patent law 2001)	

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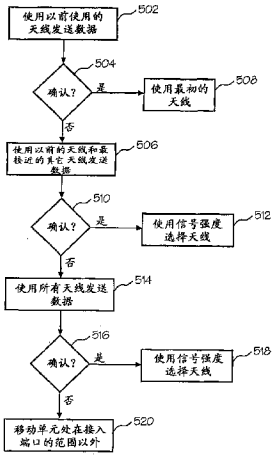
权利要求书 4 页 说明书 7 页 附图 5 页

[54] 发明名称

具有定向天线的接入端口

[57] 摘要

提供了按照本发明的示例性实施例的、在具有无线交换机(204)的无线网(200)中使用的接入端口(208，210)。接入端口(300)包括收发信机(306)，用来根据由无线交换机(204)生成的路由信息发送数据。天线选择器(308)耦合收发信机与多个天线(310－316)。天线选择器被配置成至少部分地根据路由信息选择性地耦合收发信机(306)与多个天线中的至少一个天线。



1. 一种在具有无线交换机的无线网中使用的接入端口，包括：

收发信机，用来根据由所述无线交换机生成的路由信息发送数据；

多个天线；以及

被耦合在所述收发信机与所述多个天线中的每个天线之间的天线选择器，所述天线选择器被配置成至少部分地根据所述路由信息将所述收发信机选择性地耦合到所述多个天线中的至少一个天线。

2. 权利要求 1 的接入端口，其中所述接入端口用来经由通过有线连接耦合到所述无线交换机的有线接入端口将数据发送到所述无线交换机。

3. 权利要求 2 的接入端口，其中所述接入端口通过所述有线连接接收电力。

4. 权利要求 1 的接入端口，还包括：被耦合到所述收发信机和所述天线选择器的处理器，所述处理器用来确定要被耦合到所述收发信机的所述多个天线中的所述至少一个天线。

5. 权利要求 4 的接入端口，其中所述处理器还被配置成确定使用所述多个天线中的哪个天线来向移动单元进行发送。

6. 权利要求 5 的接入端口，其中所述处理器还被配置成当所述移动单元从由所述多个天线中的第一定向天线覆盖的第一区域移动到由所述多个天线中的第二定向天线覆盖的第二区域时跟踪所述移动单元。

7. 权利要求 6 的接入端口，其中所述处理器还被配置成：

通过使用所述多个天线中的当前天线将信号发送到所述移动单元和等待响应；

如果接收到响应，则继续使用该当前天线发送信号；

如果没有从所述移动单元接收到响应，则把所述多个天线中的一个或多个附加天线和所述当前天线耦合到所述收发信机，并通过使用

所述附加天线和所述当前天线发送信号；

如果接收到响应，则选择接收到具有最大信号强度的信号的天线作为当前天线；以及

继续把所述多个天线中的附加天线耦合到所述收发信机，并发送信号直至接收到响应并将天线确定为当前天线为止，或者如果已使用了所有天线而没有接收到响应，则确定所述移动单元处在所述天线的范围以外。

8. 权利要求 1 的接入端口，其中所述天线选择器被配置成把发射机耦合到所有的所述多个天线，以广播信标信号。

9. 权利要求 1 的接入端口，其中所述多个天线中的每个天线都是定向天线。

10. 权利要求 1 的接入端口，其中所述接入端口从所述无线交换机接收软件更新。

11. 一种用于从在无线网中使用的接入端口发送信号的方法，所述无线网包括无线交换机，所述方法包括：

从所述无线交换机接收表示所述信号的目的地的路由信息；

确定从所述接入端口的多个定向天线中选择的、用来发送所述信号的第一天线；

通过天线开关将所述第一天线耦合到所述接入端口的收发信机；以及

使用所述第一天线发送所述信号。

12. 权利要求 11 的方法，其中所述耦合所述第一天线的步骤还包括：将所述多个天线全部耦合到所述收发信机，以发送信标信号。

13. 权利要求 11 的方法，还包括：

通过使用当前天线将信号发送到移动单元和等待响应；

如果接收到响应，则继续使用该当前天线；

如果没有从所述移动单元接收到响应，则把所述多个天线中的附加天线和所述当前天线耦合到所述收发信机，并通过使用所述附加天线和所述当前天线发送信号；

如果接收到响应，则选择接收到具有最大信号强度的信号的天线作为当前天线；以及

如果没有接收到响应，继续把所述多个天线中的附加天线耦合到所述收发信机，并继续发送信号直至接收到响应并将所述多个天线之一确定为当前天线为止，或者已使用了所有天线而没有接收到响应，这表示所述移动单元处在所述接入端口的范围以外。

14. 权利要求 13 的方法，其中所述通过使用所述当前天线将信号发送到移动单元和等待响应的步骤还包括：在确定还没有接收到响应之前，在没有响应的情况下多次发送该信号。

15. 权利要求 14 的方法，其中所述继续耦合附加天线的步骤还包括：选择与所述当前天线相邻的一个或多个天线作为附加天线。

16. 一种无线网，包括：

多个接入端口，包括：

收发信机；

多个天线；

被耦合在所述收发信机与所述多个天线中的每个天线之间的天线选择器，所述天线选择器被配置成耦合所述收发信机和所述多个天线中的至少一个天线；以及

被耦合到所述多个接入端口的无线交换机，所述无线交换机用来确定用于所述多个接入端口中的每个接入端口的路由信息。

17. 权利要求 16 的网络，其中所述多个接入端口的一部分被直接耦合到所述无线交换机。

18. 权利要求 16 的网络，其中所述接入端口还包括：被耦合到所述收发信机和所述天线选择器的处理器，所述处理器用来确定要被耦合到所述收发信机的、所述多个天线中的一个或多个天线。

19. 权利要求 18 的网络，其中所述处理器还被配置成当所述移动单元从由所述多个天线中的第一定向天线覆盖的第一区域移动到由所述多个天线中的第二定向天线覆盖的第二区域时跟踪所述移动单元。

20. 权利要求 16 的网络，其中所述无线交换机被配置成把软件分发到所述接入端口中的每个接入端口。

具有定向天线的接入端口

技术领域

本发明涉及无线联网领域，更具体地，涉及具有定向天线的接入端口。

背景技术

在今天的工作环境下，移动连接性正变得越来越重要。在办公室、学校、工厂或其它位置中的任何地方发送和接收数据的能力很快就变成必需能力，并引入无线局域网来实现这样的移动连接性。通常，无线局域网包括接入端口，其直接连接到诸如以太网的有线网络。在这种方法中，保持配置数据、执行客户鉴权和执行其它任务在接入端口处进行。然而，这样的方法具有许多缺陷和缺点，包括用于网络管理和维护的成本增加。

为了减轻这些缺陷和缺点的某一些，已开发了基于智能无线交换机的无线网。在这种类型的无线网中，接入端口与包含维护配置数据、执行客户鉴权和执行其它任务的智能的无线交换机耦合，而接入端口只提供无线接入。这种配置具有许多好处，包括易于管理、花费经济和灵活性。

无线局域网的潜在问题是有可能在两个或多个发送的接入端口之间发生干扰。例如，当由接入端口的全向天线产生的发射方向图与从其它的接入端口发射的辐射方向图相干扰时，会发生干扰。这种情形显示于图 1 中，在图 1 中第一接入端口 102 正试图与第二接入端口 104 通信，而第三接入端口 106 正试图与第四接入端口 108 通信。因为第一接入端口 102 使用全向天线，第一天线辐射方向图 101 以通常圆形的方向图向外扩展到第二接入端口 104。第三天线辐射方向图 103 同样地从第三接入端口 106 向外扩展到第四接入端口 108。打算用于

第二接入端口 104 的第一天线辐射方向图 101 也传播到第四接入端口 108，以及第一天线辐射方向图 101 与第三天线辐射方向图 103 会在第四接入端口 108 附近相交，从而造成可能的干扰和第四接入端口 108 潜在地不能接收来自第二接入端口 104 的通信。无论接入端口是有线还是无线接入端口，这种干扰都会发生。

因此，希望提供一种减小、基本上消除或全部消除来自重叠的辐射方向图的干扰的、具有无线接入端口的无线网络系统。此外，希望提供用于在基本上消除或全部消除来自重叠的辐射方向图的干扰的、具有无线接入端口的无线网络系统中发送信号的方法。而且，从下面结合附图、技术领域和背景技术的详细说明和所附权利要求中将明白本发明的其它想要的因素和特性。

附图说明

此后结合以下的附图描述本发明，其中相同的标号表示相同的单元，以及：

图 1 显示在两个发送的接入端口之间的干扰；

图 2 显示按照示例性实施例的无线网；

图 3 显示按照示例性实施例的无线接入端口；

图 4 显示按照示例性实施例的、以最小化干扰进行发送的两个接入端口；以及

图 5 是显示按照本发明的示例性实施例的、用于定位移动单元的方法的流程图。

发明概要

在本发明的示例性实施例中，提供了在具有无线交换机的无线网中使用的接入端口。接入端口包括收发信机，用来根据由无线交换机生成的路由信息发送数据。天线选择器耦合收发信机与多个天线。天线选择器被配置成至少部分地根据路由信息，选择性地耦合收发信机与多个天线中的至少一个天线。

在本发明的另一个示例性实施例中，提供了用于从在包括无线交换机的无线网中使用的接入端口发送信号的方法。首先，从无线交换机接收表示信号的目的地的路由信息。然后，确定从接入端口的多个定向天线中选择的第一天线用来发送信号。第一天线通过天线开关被耦合到接入端口的收发信机。使用第一天线发送信号。

具体实施方式

以下的详细说明本身仅仅是示例性的，且不打算限制本发明或本发明的应用和使用。而且，不打算由在前面的技术领域、背景技术、发明概要或以下的详细说明中给出的任何明确的或隐含的理论限定本发明。

图 2 显示分布在建筑物楼层、设施或其它位置的示例性无线局域网 200。无线局域网 200 包括被耦合到有线接入端口 208 的无线交换机 204。无线局域网还包括被配置成与有线接入端口 208 通信的无线接入端口 210。无线局域网 200 还包括可以互相通信以及与无线局域网 200 中的其它设备通信和与无线局域网 200 外的设备通信的移动单元 214。

无线交换机 204 被配置成为无线局域网 200 提供集中式管理和智能。无线交换机 204 可以确定用于无线局域网 200 中的数据传送的最佳路由路径，以及把路由信息提供到有线接入端口 208 和无线接入端口 210。无线交换机 204 还被配置成把软件和软件更新分发到有线接入端口 208，以及有线接入端口 208 可以把软件和软件更新发送到无线接入端口 210。在一个实施例中，无线交换机 204 把无线局域网 200 耦合到诸如互联网的外部网络。

有线接入端口 208 经由有线连接 205 连接到无线交换机 204，该有线连接 205 提供在有线接入端口 208 与无线交换机 204 之间的数据传送。此外，有线连接 205 可以把电源提供到有线接入端口 208。有线接入端口 208 还被配置成发送和接收来自移动单元 214 和无线接入端口 210 的数据。可以在无线交换机 204 处至少部分地确定用于有线

接入端口 208 的路由信息。

无线接入端口 210 被配置成通过无线链路 207 与移动单元 214 和有线接入端口 208 通信。无线接入端口 210 利用由无线交换机 204 提供的路由信息，帮助确定将数据发送到哪里。不像有线接入端口 208，无线接入端口 210 不是经由有线连接 205 连接到无线交换机 204，而是经由有线接入端口 208 与无线交换机 204 通信。

按照本发明的示例性实施例的接入端口 300 被显示于图 3 中。图 3 所示的接入端口 300 是无线接入端口，虽然接入端口 300 也可以是有线接入端口。如果接入端口 300 是有线接入端口，则将提供有线收发信机(未示出)，以使在接入端口 300 与无线交换机 204 之间能够进行通信。接入端口 300 包括被耦合到收发信机 306 的处理器 302。天线 310-316 经由天线选择器 308 耦合到收发信机 306 和处理器 302。

收发信机 306 被配置成将传输发送到无线接入端口 210、有线接入端口 208 和移动单元 214 和接收来自无线接入端口 210、有线接入端口 208 和移动单元 214 的传输。虽然图 3 显示了组合的收发信机 306，但按照本发明，也可以使用分开的接收机和发射机。

处理器 302 被配置成执行对于接入端口 300 的操作所需要的各种程序。例如，处理器 302 可被配置成确定适当的天线 310-316，以便用于传输。

天线 310-316 在给定的区域内接收和发送信号。在一个示例性实施例中，天线 310-316 是其辐射方向图是波瓣形式的定向天线，该辐射方向图对于给定的天线位置从每个天线沿一个方向向外扩展。通过围绕接入端口以近似均匀间隔的方向图放置天线，每个天线覆盖围绕接入端口 300 的 360 度弧度的某个部分。在图 3 所示的示例性实施例中，四个天线 310-316 中的每一个天线均匀地间隔开，并在四个天线中的每一个的 90 度覆盖区域内接收和发送数据。虽然图 3 上显示四个天线，但天线的确切数目可以根据每个天线 310-316 想要覆盖的区域而变化。

天线选择器 308 被配置成把收发信机 306 与一个或多个用于发送

和接收广播的天线 310-316 相耦合。通过使用天线选择器 308，单个收发信机 306 可以通过天线 310-316 的任何组合发送信号。在一个示例性实施例中，处理器 302 可以确定要使用的天线，并可以控制天线选择器 308 来选择适当的天线。选择适当的天线可以是至少部分地基于由无线交换机 204 提供的路由信息。虽然处理器 302 和天线选择器 308 被显示为分开的单元，但这两个部件可以被形成为单个的集成部件。在一个示例性实施例中，天线选择器 308 可被实现为场可编程门阵列(FPGA)。

为了减小来自重叠的全向天线发射的干扰的可能性，在本发明的一个示例性实施例中，可选择性地选择接入端口 300 的定向天线 310-316 以避免来自相邻的接入端口 300 的干扰。接入端口 300 可以是有线或无线接入端口。在图 3 所示的实施例中，接入端口 300 包括被耦合到共同的收发信机 306 的四个定向天线 310-316。定向天线 310-316 的数目可以在本发明的范围内变化。天线选择器 308 可以把收发信机 306 选择性地耦合到一个或多个用于发送信号的天线 310-316，该选择至少部分地依赖于目的地接入端口或移动单元 214 的位置。可替换地，全部四个定向天线 310-316 可被使用来同时发送可被使用来指示接入端口与移动单元 214 的邻近的信号。这种传输被称为信标信号(beacon signal)。使用来发送信号的天线的数目的选择取决于应用，并且可以在本发明的范围内变化。

由于接入端口 300 的天线 310-316 可以沿天线波瓣发送，该天线波瓣只覆盖由典型的全向天线产生的辐射方向图包围的区域的一部分，所以可以通过使用这个特性避免在接入端口之间的干扰。转到图 4，第一接入端口 402 正在通过使用最接近于第二接入端口 404 的天线 410 与第二接入端口 404 通信。应当指出，用于第一接入端口 402 的发送天线 410 的第一天线辐射方向图 412(即，天线波瓣)不扩展到第四接入端口 408，所以，它不干扰由第三接入端口 406 产生的第三辐射方向图 416。因此，第三接入端口 406 可以通过使用最接近于第四接入端口 408 的天线 410 与第四接入端口 408 通信，而不受来自第一

接入端口 402 的干扰。

如前所述，本发明的如图 3 所示的示例性接入端口 300 当与另一个接入端口或移动单元 214 通信时可以选择使用适当的天线。由于移动单元 214 本身可以移动，被使用来与移动单元 214 通信的天线可以改变。所以，当移动单元从由天线 310-316 中的一个覆盖的区域移动到由同一个接入端口的天线 310-316 中的另一个覆盖的另一个区域时，需要跟踪移动单元 214。图 5 是用于选择被使用来由移动单元通信的天线的示例性方法 500 的流程图。在本发明的这个示例性实施例中，假设可以是有线或无线接入端口的接入端口 300 具有四个天线 310-316。另外，已知移动单元 214 的以前的位置以及上次被使用来与移动单元 214 通信的天线，这里称为当前天线。

在方法 500 的步骤 502，通过使用作为当前天线的天线，诸如天线 310，从接入端口 400 发送数据分组。接着，确定在设置的尝试次数内，诸如三次尝试，是否接收到来自移动单元 214 的确认(步骤 504)。如果在步骤 504 接收到确认，则天线 310 被识别为用来与移动单元 214 联系的当前天线(步骤 508)。

如果在设置的尝试次数后没有接收到确认，则在步骤 506，使用当前天线和一个或多个附加天线发送数据分组。在示例性实施例中，首先选择与当前天线相邻的天线。在本例中，当前天线是天线 310，并且与当前天线相邻的两个附加天线是天线 312 和天线 316。接着，在步骤 510，确定在固定的尝试次数内在三个天线的任一个天线处是否接收到确认。

如果接收到来自移动单元 214 的确认，则该确认可能由天线 310，312 和 316 中的一个以上天线接收。如果一个以上的天线接收到确认，则可以在步骤 512 根据接收信号的信号强度或信号质量的某个其它度量来选择作为新的当前天线的天线。

如果任何天线都没有接收到确认，则全部四个天线 310-316 都被使用来发送分组(步骤 514)。然后确定在固定的尝试次数内在四个天线的任一个天线处是否接收到确认(步骤 516)。如果接收到确认，则可以

根据在天线 310-316 处测量的接收信号强度来确定用作为新的当前天线的天线(步骤 518)。如果没有接收到确认，则假设移动单元 214 已移动到由不同的接入端口覆盖的区域(步骤 520)。

图 5 所示的方法假设有四个天线。如果天线的数目是不同的，则在该方法中，在每次不成功的尝试后添加附加天线作为广播天线，直至接收到响应或已使用了所有的天线但仍没有响应为止。如果在所有的天线都被使用后仍没有响应，则假设移动单元已移动到该接入端口的范围以外。

虽然在以上的详细说明中给出至少一个示例性实施例，但应当看到，可以存在许多变型。还应当看到，一个或多个示例性实施例仅仅是例子，它无论如何不打算限制本发明的范围、可应用性或配置。而是以上的详细说明将给本领域技术人员提供用于实施一个或多个示例性实施例的方便的道路图。应当看到，可以在单元的功能和安排上作出各种改变而不背离如在所附权利要求及其合法的等同物中阐述的本发明的范围。

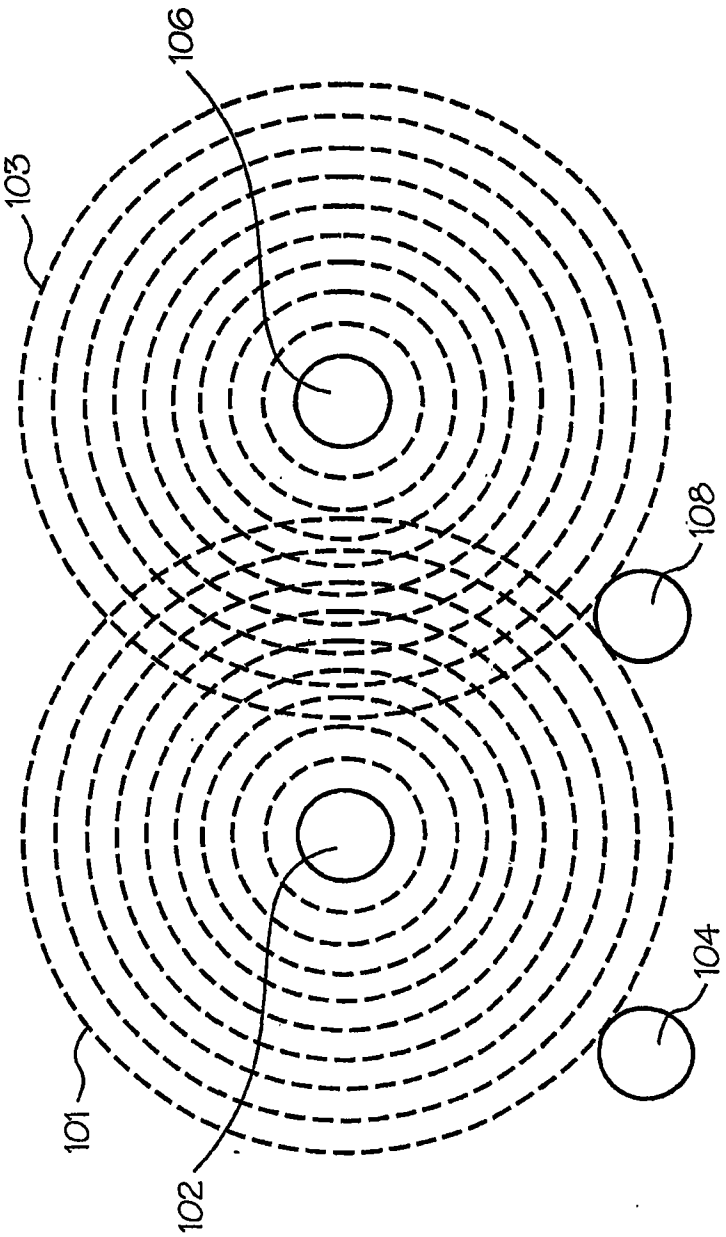


图 1

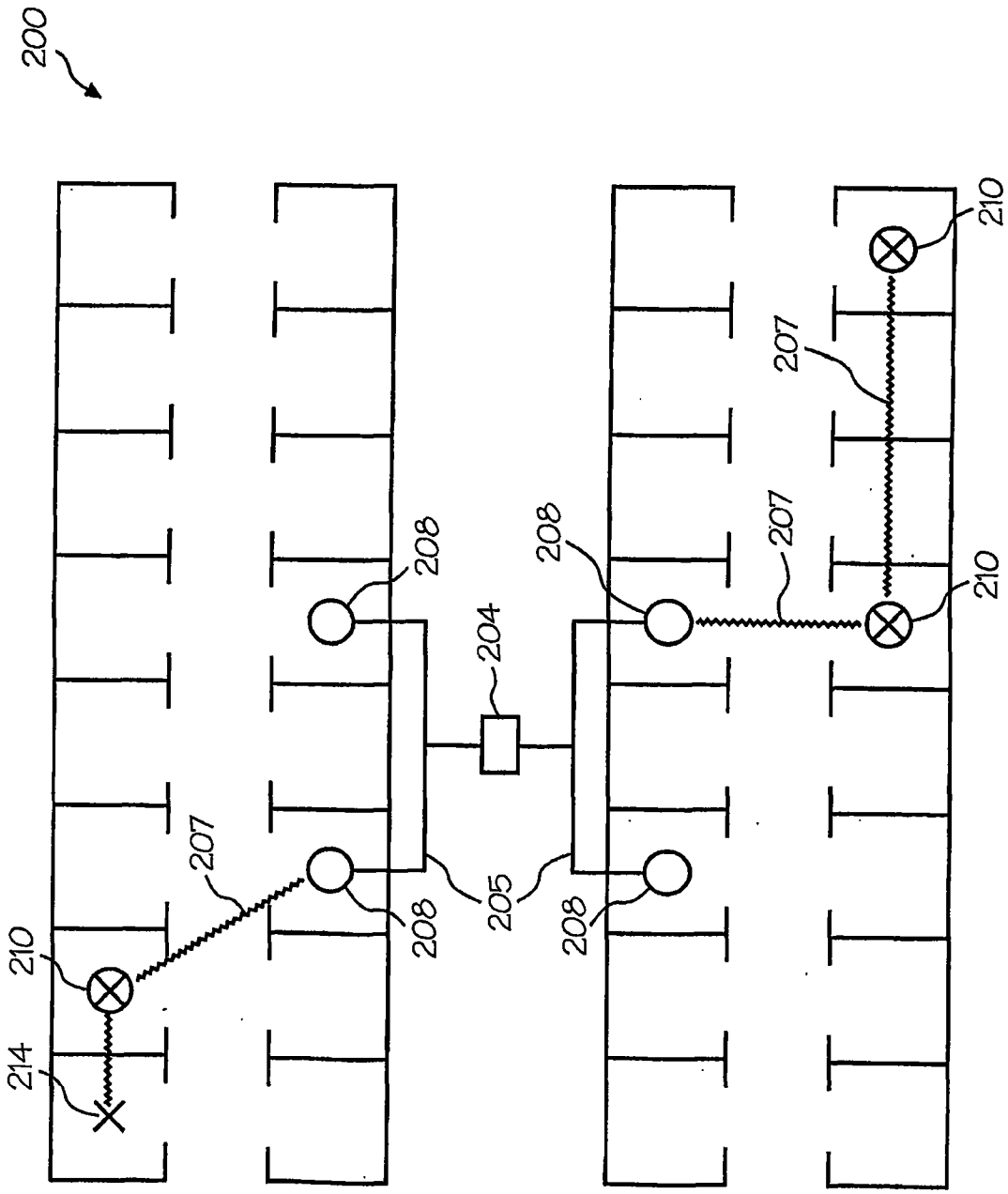


图2

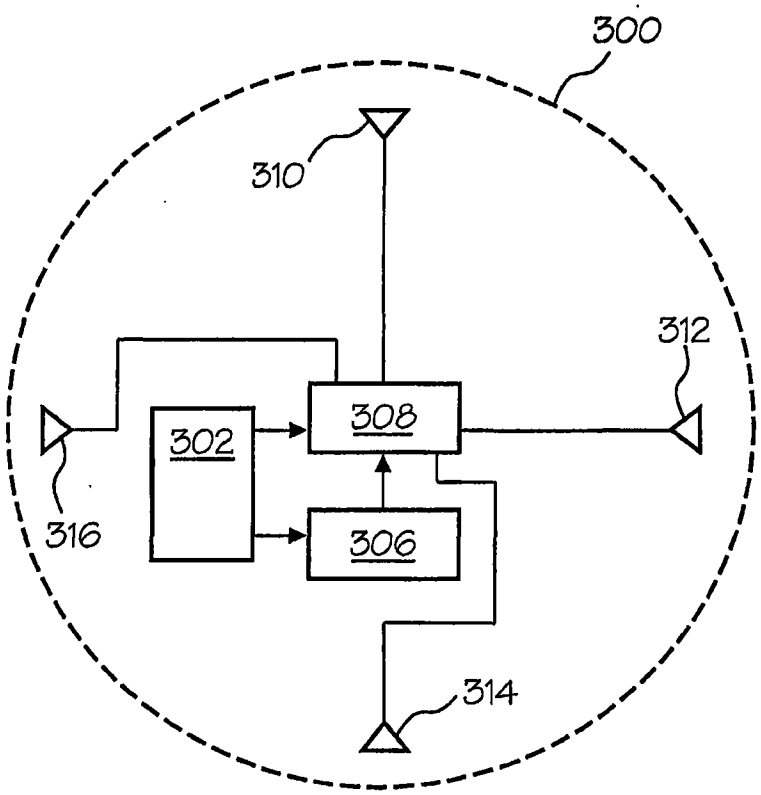


图 3

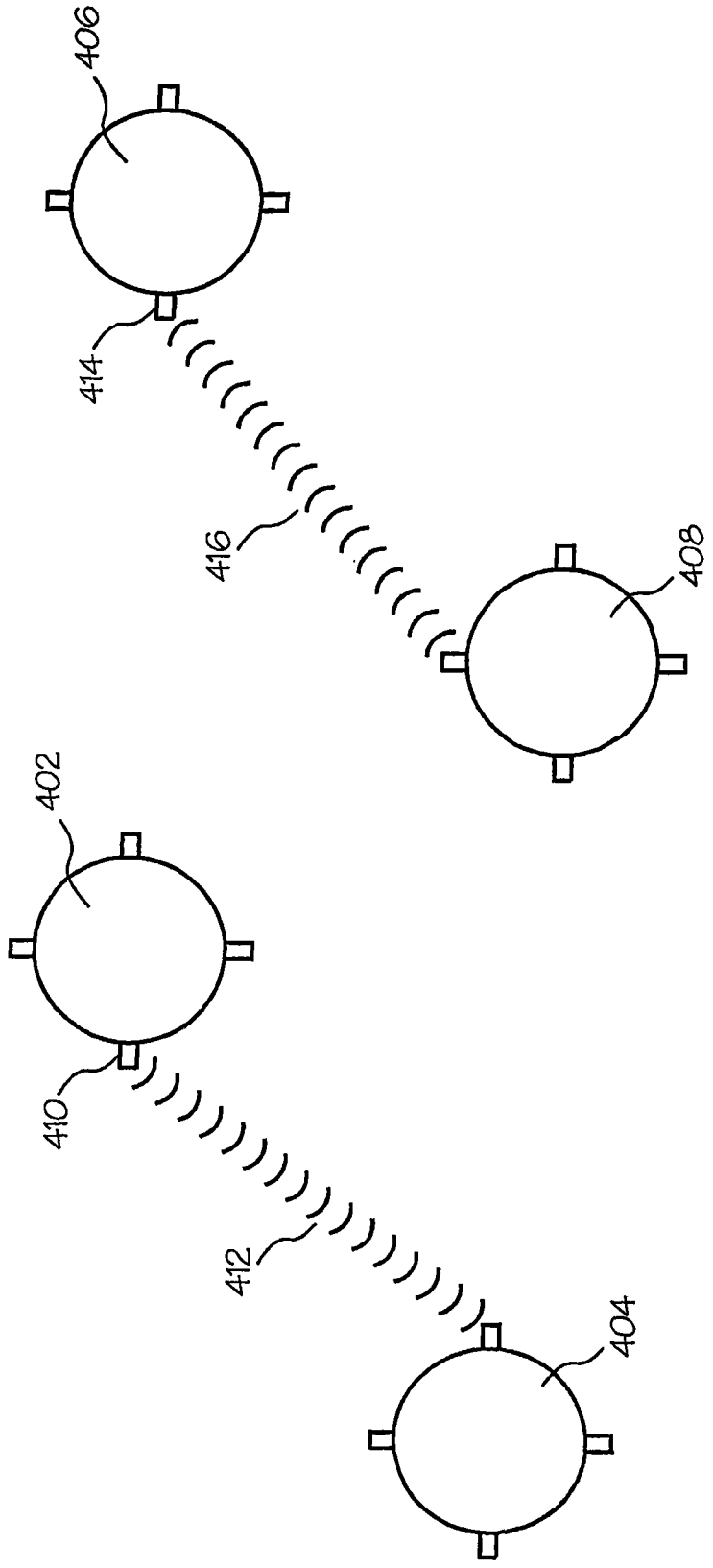


图 4

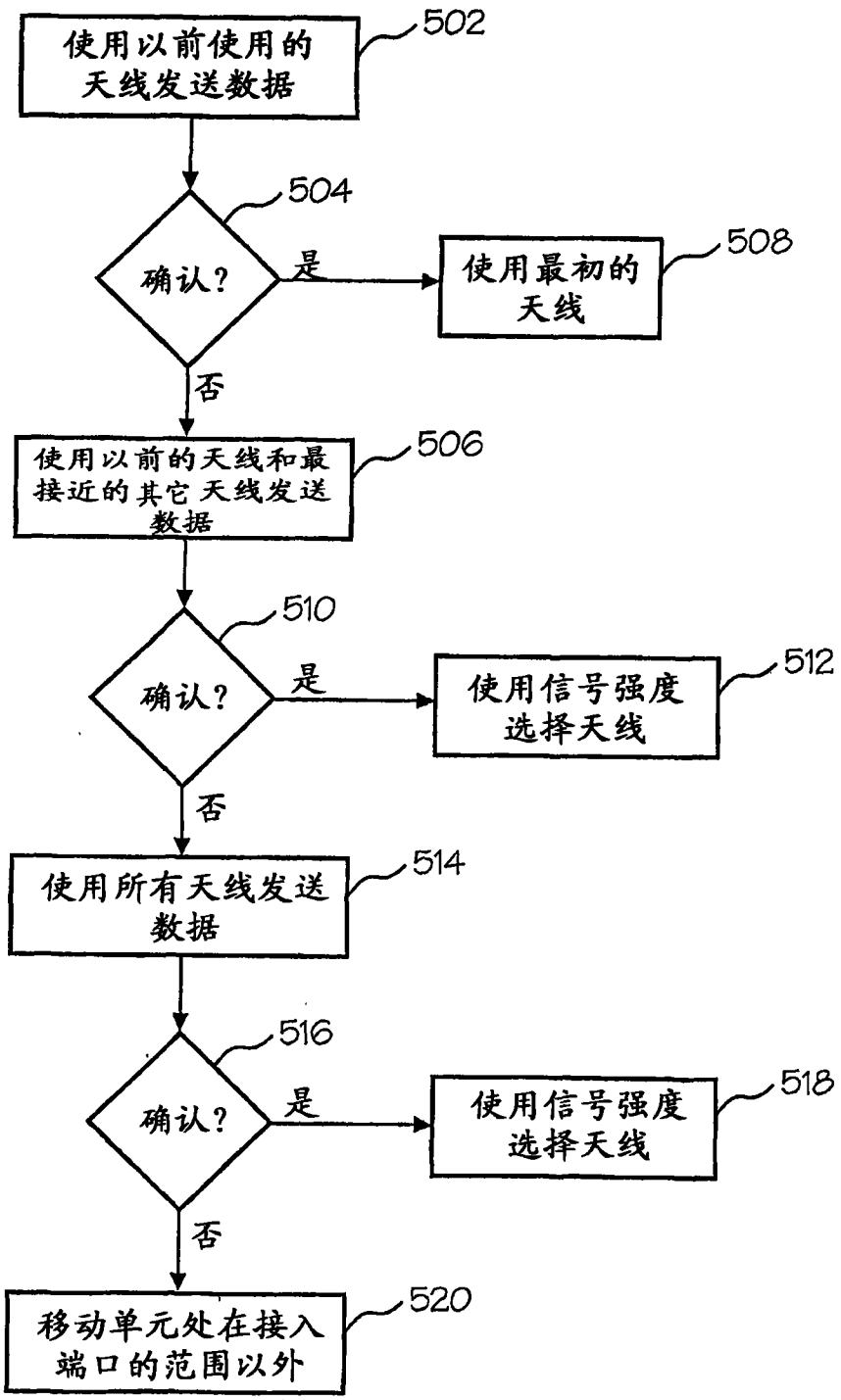

使用以前使用的天线发送数据
502
确认?
504
是
使用最初的天线
508
否
使用以前的天线和最接近的其它天线发送数据
506
确认?
510
是
使用信号强度选择天线
512
否
使用所有天线发送数据
514
确认?
516
是
使用信号强度选择天线
518
否
移动单元处在接入端口的范围以外
520

图5

Patents

Access ports with directional antennas

Abstract

translated from Chinese

Providing access port (208, 210) is used in a wireless network having a wireless switch (204) (200) according to an exemplary embodiment of the present invention. Access port (300) comprises a transceiver (306) for transmitting data in accordance with routing information generated by the wireless switch (204). Antenna selector (308) coupled to the transceiver and the plurality of antennas (310-316). The antenna selector is configured to at least in part on the routing information is selectively coupled to a transceiver (306) to at least one of the plurality of antennas.

Classifications

H04W16/28 Cell structures using beam steering

View 1 more classifications

CN101233722A

China

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Other languages: Chinese

Inventor: 拉梅施·塞克哈尔

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2005 US 2006 CA CN WO EP

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Info: Patent citations (8), Cited by (1), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (19)

translated from Chinese

1. A method used in a wireless network having a wireless access port of a switch, comprising: a transceiver for transmitting data in accordance with the routing information generated by the wireless switch; a plurality of antennas; and a transceiver coupled between the letter machine the plurality of antenna selector between antennas for each antenna, the antenna selector is configured in part on the routing information to the transceiver is selectively coupled to said plurality of at least at least one antenna of the antenna.

2. The access port of claim l, wherein said access port is used to send data to the wireless switch via a connector coupled to the wireless switch via a wired access port cable.

3. The access port of claim 2, wherein said access port is connected via the wired receiving power.

L access port of claim 1, further comprising: a transceiver coupled to the antenna selector and the processor for determining said to be coupled to said plurality of transceiver the antennas of the at least one antenna.

5. The access port of claim 4, wherein the processor is further configured to determine which of the plurality of antennas of an antenna to transmit to the mobile unit.

6. The access port of claim 5, wherein the processor is further configured to, when the moving unit moves from a first area by the plurality of antennas to a first directional antenna is covered by a plurality of said tracking said mobile unit in a second area of the antenna covered by a second directional antenna.

7. The access port of claim 6, wherein the processor is further configured to: transmit to the mobile unit and the current antenna by using said plurality of antennas in response to signal waiting; if a response is received, proceed to the current antenna using a signal transmitted; if the mobile unit does not receive a response from, the plurality of antennas put one or more additional antennas and the current antenna coupled to the transceiver, and by using the said additional antenna and the antenna to transmit a signal current fan; if a response is received, selecting the received signal having the maximum signal strength as the current antenna the antenna; and continuing the additional antenna coupled to the plurality of antennas of the transceiver machine, and sends a signal until a response is received until the current is determined as the antenna and the antenna, or, if all the antennas have been used without receiving a response, determining that the mobile unit is in other than the range of the antenna.

L access port to broadcast a beacon signal as claimed in claim 8, wherein the antenna selector configured to couple the transmitter to all of said plurality of antennas.

9. The access port of claim l, wherein said plurality of antennas in each antenna is a directional antenna.

10. The access port of claim i, wherein said access ports receive software updates from the wireless switches.

11. A method for an access port from a transmission signal used in a wireless network, said wireless network comprising a wireless switch, the method comprising: receiving a wireless switch from the destination of the routing information signal ; determining selected from a plurality of directional antennas in the access port, a first antenna for transmitting the signal; antenna switch via the first antenna coupled to the transceiver access port; and transmitting the first signal using the antenna.

12. The method of claim 11, wherein the step of coupling the first antenna further comprises: a plurality of antennas coupled to all of the transceiver, to transmit a beacon signal.

13. The method of claims shore and il, further comprising: transmitting a signal by using the current antenna and waiting for a response to the mobile unit; if a response is received, then continue to use the current antenna; if not receiving a response from the mobile unit, put the additional antenna in the plurality of antennas and the current antenna coupled to the transceiver, and sends a signal by using the additional antennas and the current antenna; if a response is received, then the selection is received with a maximum antenna signal as the current signal strength of the antenna; and if no response is received, continues to a plurality of antennas additional antenna coupled to the transceiver, and continue until a response is received transmission signal and the plurality one of the antennas is determined until the current antenna or antenna have been used in all no response is received, this indicates the mobile unit is in a range outside of the access port.

14. The method of claim 13, wherein the transmission signal to the antenna by using the mobile unit and the current step of waiting a response further comprising: prior to determining the response has not been received, the transmitted multiple times without a response signal.

15. The method of claim 14, wherein the step of coupling said additional antenna continues further comprising: selecting a current antenna adjacent to the one or more antennas as an additional antenna.

Antenna selector coupled between each antenna of the transceiver and the plurality of antennas; a transceiver; a plurality of antennas: kinds of wireless networks, comprising - 16: a plurality of access ports, comprising , the antenna selector configured to couple the transceiver and the at least one antenna of said plurality of antennas; and a switch coupled to said plurality of wireless access ports, the wireless switch to determine with each routing information to the plurality of access ports in the access port.

17. The network of claim 16, wherein is directly coupled to the plurality of wireless access ports of the switch portion.

18. The network of claim 16, wherein said access port further comprising: coupled to the transceiver and the antenna selector processor to determine to be coupled to the transceiver and the plurality of antennas to one or more antennas.

19. The network of claim 18, wherein the processor is further configured to, when the moving unit moves from a first area by the plurality of antennas to a first directional antenna is covered by the plurality of antennas tracking said mobile unit a second region of the second directional antenna coverage. 20. The network of claim 16, wherein said wireless switch is configured to distribute software to each of the access port of the access port.

Description

translated from Chinese

BACKGROUND access port having a directional antenna of the invention relates to the field of wireless networking, and more particularly, relates to an access port having a directional antenna. BACKGROUND in today's work environment, mobile connectivity is becoming increasingly important. Capacity anywhere in an office, school, factory or other location in the transmission and reception of data quickly becomes necessary capacity, and the introduction of wireless LAN to implement such mobile connectivity. Typically, a wireless local area network includes access ports that are directly connected to a wired network such as Ethernet. In this method, holding the configuration data, perform client authentication and perform other tasks at the access port. However, such methods have a number of drawbacks and disadvantages, including increased costs for network management and maintenance. In order to alleviate these drawbacks and disadvantages of certain ones we have developed a wireless network based intelligent wireless switch. In this type of wireless network, the access port comprising maintaining configuration data, performing client authentication and a wireless switch coupled smart perform other tasks while the access ports provide only wireless access. This configuration has many benefits, including easy-to-manage, cost economy and flexibility. Wireless LAN potential problem is possible occurrence of interference between two or more access ports transmitted. For example, when the whole emission pattern generated by the antenna of the access port from interfering with the radiation pattern of the other access port transmitted, interference may occur. This situation is shown in FIG. 1, FIG. 1 in a first communication access port 102 is attempting to communicate with a second access port 104, and a third access port 106 is attempting to access port 108 and the fourth. Because the first access port 102 using the omnidirectional antenna, a first antenna radiation pattern 101 in a generally circular pattern extend outwardly to a second access port 104. The third antenna radiation pattern 103 likewise extending outwardly from the third to the fourth access port 106 access port 108. Intended for antenna radiation pattern IOI also spread to the fourth access port 108, and a first antenna radiation pattern 101 103 intersect with the third antenna radiation pattern in the vicinity of the fourth access port 108, resulting in possible interference and potentially fourth access port 108 can receive communications from a second access port 104. Whether wired or wireless access port access port, such interference occurs. Accordingly, it is desirable to provide a method of reducing, eliminating or substantially all of the one thousand eliminate interference from overlapping radiation patterns having a wireless access port of a wireless network system. Further, it is desirable to provide a method of transmitting signals to eliminate or substantially eliminate interference from all of the radiation pattern of overlapping, the wireless network system with wireless access ports for. Further, from the following drawings, to understand the desired properties and other factors of the present invention Technical field and background detailed description and in the appended claims. BRIEF DESCRIPTION hereinafter be described in conjunction with the present invention, the following drawings, wherein like reference numerals refer to like elements, and: Figure 1 shows two access ports interference between transmitted; FIG. 2 shows according to an exemplary embodiment of a wireless network; Figure 3 shows a wireless access port in accordance with an exemplary embodiment; Figure 4 shows, to minimize interference of the two access port transmission according to an exemplary embodiment; and Figure 5 is an exemplary display according to the invention , a flowchart of a method for locating a mobile unit according to an embodiment. SUMMARY OF THE INVENTION In an exemplary embodiment of the present invention, there is provided an access port used in a wireless network having a wireless switch. The access port comprises a transceiver, the transmission data used to route information generated by the wireless switch in accordance with. Antenna selector coupling transceiver and the plurality of antennas. The antenna selector is configured to at least in part on routing information, selectively coupling transceiver and the plurality of antennas at least one antenna. In another exemplary embodiment of the present invention, there is provided a method for transmitting a signal from the access port comprises a wireless switch used in the wireless network. First, the switch from receiving a radio signal destination routing information. Then, it is determined selected from the plurality of directional antennas of the access port of the first antenna for transmitting a signal. A first antenna coupled to the transceiver of the access port through an antenna switch. Using a first antenna signal transmission. DETAILED DESCRIPTION The following detailed description is merely exemplary in nature itself, not intended to limit the invention or the application and uses of the present invention. Further, the present invention is not intended to be defined by any expressed or implied theory presented in the summary and detailed description preceding technical field, background, brief or less. 2 shows an exemplary distribution of wireless local area network 200 of a building, facility or other location. WLAN 200 includes a wired access port coupled to the wireless switches 208 204. Further comprising a wireless local area network configured to communicate with the wired access port 208 of the wireless access port 210. WLAN 200 may communicate with each other, and further comprising a mobile unit communication apparatus 200 and the outside of the wireless local area network, and other communication devices 200 with a wireless LAN 214. Wireless Switch 204 is configured to provide wireless local area network 200 centralized management and intelligent. Wireless switch 204 can determine optimal routing paths for wireless LAN transmission data 200, and provides the routing information to the wired access port 208 and the wireless access port 210. Wireless switch 204 is further configured to distribute software and software updates to the wired access port 208, and a wired access port 208, and software updates can be sent to the wireless access port 210. In one embodiment, the wireless switch 204, WLAN 200 is coupled to an external network such as the Internet. Cable access port 205 is connected via a wired connection 208 to the wireless switch 204, the wired connection 205 provides data transfer between the wired access ports 208 and 204 of the wireless switch. Further, the wired connection 205 may provide power to the wired access port 208. Cable access port 208 is further configured to send and receive data from mobile units 214 and wireless access ports 210. It may determine routing information for the wired access port 208 in the wireless switch 204 at least partially. Wireless access port 210 is configured by a wireless link 207 with the mobile units 214 and wired access ports 208 communicate. Wireless access

ports 210 utilize routing information provided by the wireless switch 204 to help determine where to send the data. Unlike the wired access ports 208, the wireless access port 210 via a wired connection 205 is not connected to the wireless switches 204, 204 but communicate via a wired access port 208 and the wireless switch. Access according to an exemplary embodiment of the present invention, the port 300 is shown in FIG. The access port 300 shown in FIG. 3 is a wireless access port, although access port 300 may be a wired access port. If the access port 300 is a wired access port, then the wired transceiver (not shown), to enable communication between the access port 300 and the wireless switch 204. Access port 300 includes a processor coupled to the transceiver 306 302. 310-316 antenna selector 308 is coupled via an antenna to the transceiver 306 and the processor 302. The transceiver 306 is configured to send a transmission to the wireless access ports 210, wired access ports 208 and mobile units 214 and receive information from wireless access ports 210, wired access ports 208 and transmission unit 214 of the mobile. Although Figure 3 shows the transceiver 306 in combination, but according to the present invention, may be used a separate receiver and transmitter. The processor 302 is configured to execute various programs for operation of the access port 300 is required. For example, processor 302 may be configured to determine appropriate antenna 310-316, for use in transmission. Antennas 310-316 receive and transmit signals within a given area. in one exemplary embodiment, antennas 310-316 of its radiation pattern the form of a lobe of a directional antenna, the radiation pattern for a given outwardly extended position of the antenna in one direction from each antenna. By placing the antenna direction around the access port of FIG approximately evenly spaced, each antenna covers 360 degree arc around a portion of the access port 300. In the exemplary embodiment shown in FIG. 3, four antennas each of antennas 310-316 are evenly spaced, and cover 90 of each of the receive and transmit data in a region of four antennas. Although Figure 3 shows four antennas, but the exact number of antennas can vary depending upon the desired coverage area of each antenna 310-316. Antenna selector 308 is configured to the transceiver 306 and 310-316 for one or more coupled to an antenna for transmitting and receiving a broadcast. 308, a single transceiver 306 may transmit signals through any combination of antennas 310-316 by using the antenna selector. In one embodiment, the processor 302 may determine that the antenna to be used in the exemplary embodiment, and can control the antenna selector 308 to select the appropriate antenna. Selecting an appropriate antenna can be at least partially based on the routing information supplied by the wireless switch 204. While processor 302 and antenna selector 308 are shown as separate units, but the two members may be formed as a single integrated component. In one exemplary embodiment, antenna selector 308 can be implemented as a field programmable gate array (FPGA). In order to reduce the possibility of interference from one thousand to transmit the whole antenna overlaps, in one exemplary embodiment of the present invention, the access port may be selectively chosen 310-316 directional antenna 300 to avoid contact from the adjacent the interference port 300. The access port 300 can be a wired or wireless access port. In the embodiment shown in FIG. 3 embodiment, the access port 300 is coupled to a common include a transceiver 306 of four directional antennas 310-316. The number of directional antennas 310-316 can be varied within the scope of the present invention. Antenna selector 308 can selectively transceiver 306 coupled to an antenna for transmitting one or more signals 310-316, the selection of the at least partially dependent on the location 214 on the destination access port or mobile unit. Alternatively, all four directional antennas 310-316 can be a signal to indicate the access port adjacent the mobile unit 214 using simultaneous transmission may be used. This transmission is called a beacon signal (beacon signal). Transmitting a signal using the antenna number selection depends on the application, and may be varied within the scope of the present invention. Since the antenna of the access port 300 may be transmitted along the antenna 310-316 lobe, the antenna lobe typically cover only a portion of the generated radiation pattern antenna of FIG whole region surrounded, can be avoided by the use of this feature in the access interference between ports. 4, a first access port 402 is being used by the closest access port 404 to the second antenna 410 is in communication with the second access port 404. It should be noted, the first access port for a first transmit antenna 402 antenna radiation pattern 410 is 412 (i.e., the antenna lobe) does not extend to the fourth access port 408, so that it does not interfere with the access by a third the third port 406 generated by the radiation pattern 416. Thus, a third access port 406 can use the closest access communication port 408 of the fourth antenna 410 and the fourth access port 408, without interference from the first access port 402. As described above, the exemplary access illustrated in FIG. 3 of the present invention, when port 300 with another access port or mobile unit 214 can choose to groom through appropriate antenna. Since the mobile unit 214 itself can be moved, it can be changed to be used with an antenna 214 communicating with the mobile unit. Therefore, when the mobile unit moves from an area covered by the antenna 310-316 to one another region covered by another antenna port 310-316 in the same access, it is necessary to track the mobile unit 214. FIG 5 is a flowchart of an exemplary method is used reason the antenna 500 of mobile unit communications selection. In this exemplary embodiment of the present invention, it may be assumed that access to a wired or wireless access port of the port 300 with four antennas 310-316. Further, previously known location and the mobile unit 214, the antenna was last used to communicate with the mobile unit 214, referred to herein as the current antenna. 502, by using the current antenna as an antenna, such as antenna 310, transmission data packet from the access port 400 in step 500 of the method. Next, it is determined in a set number of attempts, such as three attempts, if the acknowledgment is received (step 504) from the mobile unit 214. If the acknowledgment is received at step 504, the antenna 310 is identified as the current antenna 214 to contact with the mobile unit (step 508). If no acknowledgment is received after a set number of attempts, then in step 506, using the current antenna and one or more additional antennas transmit data packets. In an exemplary embodiment, the first selected current antenna adjacent antenna. In the present embodiment, the current antenna is an antenna 310, and the current antenna adjacent two additional antenna 312 and the antenna 316 is an antenna. Next, at step 510, it is determined whether any acknowledgment is received at the internal antenna a fixed number of attempts three antennas. If an acknowledgment is received from the mobile unit 214, the confirmation may be 310, 312, and 316 more than one antenna is received by the antenna. If more than one antenna received the acknowledgment, at step 512 may be selected as the new current antenna the antenna according to some other measure of signal strength or signal quality of the received signal. If any of the antenna does not receive the acknowledgment, then all four antennas 310-316 are transmitted to the packet (step 514) to use. Then determines whether the acknowledgment is received (step 516) in any of a number of attempts the internal antenna fixed four antennas. If the acknowledgment is received, it may be based on received signal strength measured at the antenna 310-316 to determine a new current antenna is used as an antenna (step 518). If no acknowledgment is received, it is assumed that the mobile unit has moved to the area 214 (step 520) covered by a different access port. The method shown in FIG. 5 assuming four antennas. If the number of antennas is different, then in the process, adding additional antenna as the broadcast antenna after each unsuccessful attempts until a response is received or all of the antennas have been used so far, but still no response. If still no response after all the antennas are used, it is assumed that the mobile unit has moved beyond the range of the access port. While at least one exemplary embodiment described in detail above, it should be seen that there may be many variations. it will also be seen that one or more exemplary embodiments are only examples, which in no way intended to limit the scope of the present disclosure, applicability, or configuration. But the foregoing detailed description will provide those skilled convenient road map for implementing one or more of the exemplary embodiments. It should be noted that various changes may be made in the function and arrangement of elements without departing from the scope of the invention as set forth in the appended claims and their legal equivalents.

Patent Citations (8)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
US6445688B1 *	2000-08-31	2002-09-03	Ricochet Networks, Inc.	Method and apparatus for selecting a directional antenna in a wireless communication system
US7215658B2 *	2001-01-19	2007-05-08	Nokia Corporation	Apparatus, and associated method, for utilizing antenna information determinative of antenna operation in a wireless mesh network
US6621470B1 *	2001-03-23	2003-09-16	Northrop Grumman Corporation	Tiled phased array antenna
US7072718B2 *	2002-12-03	2006-07-04	Cardiac Pacemakers, Inc.	Antenna systems for implantable medical device telemetry

US20050058111A1 *	2003-09-15	2005-03-17	Pai-Fu Hung	WLAN device having smart antenna system
US20050232206A1 *	2004-04-15	2005-10-20	Hong Kong Applied Science And Technology Research Institute Co., Ltd.	Intelligent wireless switch (IWS) and intelligent radio coverage (IRC) for mobile applications
US7366120B2 *	2004-10-18	2008-04-29	Nortel Networks, Ltd	Method and apparatus for improving quality of service over meshed bachaul facilities in a wireless network
US20060206246A1 *	2004-10-28	2006-09-14	Walker Richard C	Second national / international management and security system for responsible global resourcing through technical management to brige cultural and economic desparity

* Cited by examiner, † Cited by third party

Cited By (1)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
AU2007253692B2	2006-05-19	2012-07-12	Swimc Llc	Coating system for cement composite articles

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
US6760318B1	2004-07-06	Receiver diversity in a communication system
US6788658B1	2004-09-07	Wireless communication system architecture having split MAC layer
US20030058816A1	2003-03-27	Forwarding communication network and wireless channel allocation method therefor
US20080232296A1	2008-09-25	Apparatus and method for operating relay link in relay broadband wireless communication system
US20030119558A1	2003-06-26	Adaptive antenna pattern formation in wireless ad-hoc packet-switched networks
US20100067505A1	2010-03-18	Performance of a Wireless Communication System
US20030133422A1	2003-07-17	Mobility support via routing
US6868244B1	2005-03-01	Token-based receiver diversity
US7355998B2	2008-04-08	Support for multiple access point switched beam antennas
US20090059881A1	2009-03-05	Wireless network self-adaptive load balancer
US20050003763A1	2005-01-06	Methods and apparatus for high throughput multiple radio wireless cells and networks
US7729326B2	2010-06-01	Wireless network system with wireless access ports
US20080248802A1	2008-10-09	Antenna pattern selection within a wireless network
Hu et al.	2003	On mitigating the broadcast storm problem with directional antennas
US20060215673A1	2006-09-28	Mesh network configured to autonomously commission a network and manage the network topology
Bazan et al.	2012	A survey on MAC protocols for wireless adhoc networks with beamforming antennas
US20040157645A1	2004-08-12	System and method of operation an array antenna in a distributed wireless communication network
US20050094585A1	2005-05-05	Managed microcell wireless mesh network architecture
US20060040675A1	2006-02-23	Method for operating a radio system, emitting station and radio system
US20040157637A1	2004-08-12	Transit link coordination systems and methods for a distributed wireless communication network
Bandyopadhyay et al.	2001	An adaptive MAC and idirectional routing protocol for ad hoc wireless network using ESPAR antenna
US20040063455A1	2004-04-01	Wireless LAN with central management of access points
Singh et al.	2010	Distributed coordination with deaf neighbors: efficient medium access for 60 GHz mesh networks
US7826426B1	2010-11-02	Seamless mobility in wireless networks
US20060270352A1	2006-11-30	Beamforming systems and methods

Priority And Related Applications

Priority Applications (2)

Application	Priority date	Filing date	Title
US11/171,623		2005-06-30	
US11/171,623	2005-06-30	2005-06-30	Access ports with directional antennas

Legal Events

Date	Code	Title	Description
2008-07-30	C06	Publication	
2008-09-24	C10	Request of examination as to substance	
2010-08-18	C02	Deemed withdrawal of patent application after publication (patent law 2001)	

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(54) **Apparatus and methods for adapting mobile unit to wireless lan**

Verfahren und Vorrichtung zur Anpassung einer mobilen Einheit zu einem drahtlosen lokalen Netzwerk

Appareil et procédé pour adapter une unité mobile à un réseau local sans fil

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(56) References cited:
EP-A- 0 779 752 **EP-A- 0 893 930**
EP-A- 0 939 566 **GB-A- 2 308 946**
US-A- 5 579 373 **US-A- 5 613 204**
US-A- 5 900 838 **US-A- 5 930 710**

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EP 1 098 477 B1

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates to data communication systems, and more particularly to a wireless local area network (LAN) communication system in which mobile units associate with stationary access points having communications characteristics defined by the particular country in which the LAN is installed.

2. The Background Art

[0002] A wireless LAN may be implemented by remote mobile units (mobile units) that send messages to and receive messages from base stations or Stationary Access Points (Stationary Access Points) using wireless infrared or radio communication links. Each Stationary Access Point covers a limited area, so a typical network may have several Stationary Access Points.

[0003] One protocol that may be used is the IEEE 802.11 Standard which is a standard that defines physical and data link layers for wireless local networks. The standard defines, among other things, the wireless LAN medium access control (MAC) and physical (PHY) layer specifications.

[0004] For a message to be transmitted, a mobile unit first becomes associated with an Stationary Access Point. Association refers to the process of synchronizing a mobile unit with an Stationary Access Point for communication, and is initiated by the mobile unit. The mobile unit first listens to the broadcasts over the airwaves and determines which Stationary Access Points are within range of the mobile unit, and then requests association with a particular Stationary Access Point according to certain criteria. At any point in time, a mobile unit is typically associated with only one Stationary Access Point. A single Stationary Access Point can be associated with multiple mobile units.

[0005] GB 2308946 A discloses a mobile unit for use in a cellular radio network which includes apparatus for registering the mobile unit with a radio channel. The mobile unit includes means for storing data relating to the frequencies of radio channels operated by base sites in the network and to the geographical areas in which the mobile units are capable of using each radio channel. A location system is used to determine the current position of the mobile unit in the network. A comparing means compares the current position of the mobile unit with the stored geographical data and a selecting means selects a radio channel frequency for registration in dependence on the comparison.

[0006] US 5613204 A discloses a cellular telephone system which is upgraded by modifying subscriber units for selective service provider acquisition-during roaming. Priority of acquisition is given to those service providers associated with the home service provider. These preferred service providers are identified by System identification (SIDs) numbers. A roaming subscriber unit will tune to a single broadcast frequency to identify available system providers operating in a physical area to which the subscriber has roamed.

[0007] US 5701328 A discloses a chirped spread spectrum positioning system for locating a mobile body comprising a plurality of earth based spread spectrum (SS) broadcasting stations arranged geographically in a cellular pattern. Each SS broadcasting station include a modulator providing a channel signal structure which is substantially orthogonal with respect to adjacent stations in the cellular pattern, each channel signal including navigation beacon data including a unique beacon identification, station latitude and longitude, time slot and phase stations. In one embodiment, each modulator provides a chirped SS signal in which the navigation beacon is a frequency tone that is repeatedly swept over a selected frequency band for each station. A receiver on the mobile body receives the SS signals from at least three of the SS broadcasting stations and determines the location thereof. A fourth SS broadcasting station provides altitude. GPS satellite signals can be used for timing control.

[0008] Attention is also drawn to US 5901358 A and WO 97/17623 A.

[0009] US 5924034 A discloses a cellular mobile radio system which selects the best cell to be accessed for a given position of a mobile station by determining the distance of the mobile station relative to the base transceiver station of a cell with which it is communicating by measuring the propagation time between the mobile station and the base transceiver station, resolving the indeterminacy associated with the direction in which said mobile station is located relative to said base transceiver station, and then determining which cell the mobile station is situated in the coverage area of, this cell constituting the best cell. The resolving of the indeterminacy is rendered independent of the synchronized or non-synchronized state of the system.

[0010] US 5787354 A discloses a cellular telecommunication system (CTS) that supports the operation of a radiotelephone (RT) in cellular and cordless modes. The CTS includes operating features that are dependent upon the intrasystem location of the RT. The CTS includes a mobile telephone switching office, a plurality of land stations, a plurality of cells, a plurality of zones defined by one or more cells, a plurality of local regions defined by one or more cells, and a cordless base station located within one of the cells. The land stations transmit zone identification (ZNID) signals and local region identification (LRID) signals, which the RT receives and compares to one or more ZNID codes and one or more LRID codes, respectively. The RT displays its intrasystem billing zone location and initiates communication with the cordless base station in response to the received ZNID and LRID signals, respectively.

[0011] With the ever-growing global market, it is com-

mon for users to travel from country to country. A problem therefore occurs, in that one country may allocate a different portion of the frequency spectrum to wireless communications than another country. Additionally, different countries may have different regulations regarding power output of wireless communications. These allocations and regulations may prevent a mobile unit which is designed for use in one country from working (or being allowed to work) in another country.

[0012] What is needed, then, is a system and method for allowing a mobile unit to meet regulatory requirements and adapt to and communicate with Stationary Access Points having different communication characteristics.

BRIEF DESCRIPTION OF THE INVENTION

[0013] The present invention relates to an apparatus and method for automatically adapting a mobile unit to communication requirements of a particular country or geographic region. To achieve this capability, the invention comprises a method as set forth in claim 1. Also provided is a mobile unit as set forth in claim 10. Preferred embodiments of the present invention may be gathered from the dependent claims.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0014]

FIG. 1 is a block diagram showing a wireless network architecture.

FIG. 2 is a flow diagram illustrating a method for operating a wireless data communications network according to a presently preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Those of ordinary skill in the art will realize that the following description of the present invention is illustrative only and not in any way limiting. Other embodiments of the invention will readily suggest themselves to such skilled persons.

[0016] FIG. 1 is a block diagram showing a wireless network architecture. Host 10 is connected to Stationary Access Point 12 and Stationary Access Point 14. Stationary Access Point 12 handles wireless communications within area 16, and Stationary Access Point 14 handles communications within area 18. As shown in FIG. 1, therefore, Stationary Access Point 12 is in communication range of mobile unit 20 and mobile unit 22, and Stationary Access Point 14 is in communication range of mobile unit 20 and mobile unit 24. Mobile unit 20 is in communication range of either Stationary Access Point 12 or Stationary Access Point 14, although mobile unit 20 preferably only communicates with one of them at a time.

[0017] In one scenario, mobile unit 20 associates with an Stationary Access Point, for example Stationary Access Point 12, and thereafter communicates with Stationary Access Point 12 to transmit messages to the host or to other mobile units. If mobile unit 20 is associated with Stationary Access Point 12, mobile unit 20 could transmit a message to mobile unit 22 via Stationary Access Point 12, or to mobile unit 24 via Stationary Access Point 12, host 10, and Stationary Access Point 14.

[0018] In a preferred embodiment of the invention, a grouping of hosts and/or mobile units make up a wireless local area network (LAN).

[0019] Systems similar to the one depicted in FIG. 1 are found throughout the world. Each system, however, typically has different operating parameters in each country. According to a preferred embodiment of the present invention, a mobile unit is designed which may operate at a variety of different frequencies. The range of frequencies should be large enough to encompass some of the frequencies available for wireless communications in each country or geographic region in which the mobile unit may operate. Additionally, the mobile unit is designed to operate at a variety of different power settings, again with the range of power settings large enough to encompass at least some allowable power settings in each country in which the mobile unit may operate. These features allow the mobile unit to operate in a variety of different countries or geographic regions.

[0020] Furthermore, the mobile unit is designed to automatically configure itself for use in individual countries or geographic regions. This may be accomplished by running a program or method contained in either software or hardware within the mobile unit. FIG. 2 is a flow diagram illustrating the method according to a preferred embodiment of the present invention. At step 50, the mobile unit scans the frequency spectrum, listening for announcement messages broadcast by access points. This may encompass tuning to each available frequency an announcement message from a nearby access point is received. The announcement message will have a frequency characteristic that is unique to a particular geographic region or country.

[0021] At step 52, the frequency characteristics of the received announcement message are compared with a table or equivalent data structure contained in memory. The table may contain a listing of the breakdown of the frequency spectrum for all the different available countries or geographic regions. It also may list regulations on power output or other regulations important to the functioning of the mobile unit. At step 54, a matching country or geographic region is found. At this point, the mobile unit has determined what country or geographic region in which it is operating. At step 56, the mobile unit adjusts its operating frequency range to correspond to the country or geographic region in which it is operating. It may also alter other operating characteristics, such as power output and modulation type, in accordance with the regulations listed in the table or other data structure corresponding to the country in which the unit is located.

[0022] After the geographic region frequency and power settings (and any other operating characteristics) have been adapted for use in the country or geographic region in which the unit is located, the mobile unit operates similarly to a conventional mobile unit. '

[0023] Some regulations require that the regulations themselves be displayed to the user. Normally, these regulations would be placed on the outer surface of a unit capable of transmitting in the country. However, since the unit of the present invention may be capable of transmission in many different countries, this may not be feasible. Therefore, the unit may be configured such that, after the unit has determined the country in which it is located, the proper regulatory information is displayed to the user.

[0024] Referring back to FIG. 1, Stationary Access Point 12, Stationary Access Point 14, and host 10 may be implemented in hardware or software or a combination of hardware and software. Mobile unit 22, mobile unit 20 and mobile unit 24 may be implemented as programmable processor-based units executing software modules. An embodiment of the process performed by the software modules is described below. In one embodiment, mobile units 20, 22 and 24 are hand-held data-gathering units.

[0025] The contents of U.S. Patent No. 5,029,183 to Tymes, and U.S. Patent No. 5,668,803 to Tymes et al. show systems in which methods and apparatus consistent with the principles of the present invention may be practiced. Each patent describes a system in which hand-held data-gathering mobile units communicate via wireless link with Stationary Access Points, similar to the system shown in FIG. 1.

[0026] In another embodiment of the present invention, the mobile unit may be configured so that the user must verify the country in which they are located. For example, if the mobile unit determines through looking at the table that it is currently located in Switzerland, a message may appear on a display screen on the mobile unit saying "You are in Switzerland. Is this correct? (Y/N)". The user may then be required to confirm that they are indeed in Switzerland before the mobile unit reconfigures its settings to comply with Swiss standards. This reduces the chance of the unit mistakenly configuring itself to specific characteristics which may violate certain regulations.

[0027] In another embodiment of the present invention, a Global Positioning System (GPS) locator may be built into the mobile unit, allowing the unit to verify its location instead of or in addition to requiring confirmation from the user. This feature also reduces the chance of the unit mistakenly configuring itself to specific characteristics which may violate certain regulations.

[0028] In another embodiment of the present invention, the multiple geographic region feature (the feature embodied by the above methods) may be enabled or disabled by a user. When the feature is disabled, the mobile unit merely attempts to establish communication using a communication setting for a particular geographic region. This setting may be, for example, a default setting or the setting in use at the time the mobile unit was last turned off.

Claims

1. A method for operating a wireless data communications network including a mobile unit (20, 22, 24) and one or more access points (12, 14), wherein the method includes the steps of:

   receiving in the mobile unit (20, 22, 24) announcement messages broadcast by one or more of the access points (12, 14), each of said messages having a unique frequency characteristic associated with the geographic location of the access point (12, 14) from which it was sent; determining, in said mobile unit (20, 22, 24), an allowable frequency set in the geographic region associated with the access point (12, 14) from which each of said messages was sent; and adjusting the frequency set of the mobile unit (20, 22, 24) to send messages on said allowable frequency set,

   wherein said determining step includes the steps of:

   comparing said unique frequency characteristics of said messages to a table stored in memory of the mobile unit, said table containing a listing of various allowable frequency sets for corresponding to different geographic regions; matching said unique frequency characteristics to a single geographic region in the table; and referring to said allowable frequency set corresponding to said single geographic region,
   characterized in that
   said table further includes a listing of various allowable power output levels corresponding to different geographic regions, and

   said determining step further includes the steps of:

   referring to said allowable power output levels corresponding to said single geographic region; and
   adjusting the power output level of the mobile unit (20, 22, 24) to operate within said allowable power output levels.

2. The method of claim 1, wherein said table further includes a listing of various regulations corresponding to different geographic regions.

3. The method of claim 2, further including the step of:

   displaying said regulations corresponding to the

geographic region in which the mobile unit (20, 22, 24) is located to a user.

4. The method of claim 3, further including the steps of:

referring to said regulations corresponding to said single geographic region; and
adjusting the operating characteristics of the mobile unit (20, 22, 24) to comply with said regulations.

5. The method of any of the preceding claims, further comprising the steps of:

scanning the frequency spectrum until an announcement message from an access point (12, 14) is detected;
examining the frequency characteristics of said announcement message; comparing said frequency characteristics with a table in a memory in the mobile unit (20, 22, 24);
determining the geographic region by matching said frequency characteristics with a geographic region listed in said table, said table also listing a frequency range for each geographic region; and
adjusting the operating frequency range of the mobile unit (20, 22, 24) to correspond with said frequency range corresponding to the geographic region.

6. The method of any of the preceding claims, further including the steps of:

sending a message to a user to verify that the geographic region determined by the mobile unit (20, 22, 24) is correct; and
transmitting only if said user verifies that the geographic region determined by the mobile unit (20, 22, 24) is correct.

7. The method of any of the preceding claims, further including the steps of:

utilizing a Global Positioning System locator to verify the geographic region in which the mobile unit (20, 22, 24) is located;
transmitting only if said Global Positioning Sensor locator verifies that the geographic region determined by the mobile unit (20, 22, 24) is equivalent to the geographic region in which the mobile unit (20, 22, 24) is located.

8. The method of any of the preceding claims, wherein a user may disable the feature which executes the method.

9. A mobile unit (20, 22, 24) for use in a wireless data communications network including one or more access points (12, 14), wherein the frequency set of the mobile unit (20, 22, 24) may be modified and the mobile unit (20, 22, 24) includes:

a receiver for receiving in the mobile unit (20, 22, 24) announcement messages broadcast by one or more of the access points (12, 14), each of said messages having a unique frequency characteristic associated with the geographic location of the access point (12, 14) from which it was sent;
a processing unit for determining, an allowable frequency set in the geographic region associated with the access point (12, 14) from which each of said messages was sent; and
a frequency set adjuster for adjusting, the frequency set to send messages on said allowable frequency set,

wherein said processing unit includes:

a comparator for comparing, said unique frequency characteristics of said messages to a table stored in a memory of the mobile unit (20, 22, 24), said table containing a listing of various allowable frequency sets for corresponding to different geographic regions;
a matcher for matching, said unique frequency characteristics to a single geographic region in the table; and
a first reader for referring, to said allowable frequency set corresponding to said single geographic region,
characterized in
said table further including a listing of various allowable power output levels corresponding to different geographic regions, and
the power output level of the mobile unit (20, 22, 24) being adjustable and the mobile unit (20, 22, 24) including
a second reader for referring to said allowable power output levels corresponding to said single geographic region; and
a power output level adjuster for adjusting the power output level of the mobile unit (20, 22, 24) to operate within said allowable power output levels.

10. The mobile unit (20, 22, 24) of claim 9, wherein said table further includes a listing of various regulations corresponding to different geographic regions.

11. The mobile unit (20, 22, 24) of claim 10, further including a display, which displays said regulations corresponding to the geographic region in which the mobile unit (20, 22, 24) is located to a user.

12. The mobile unit (20, 22, 24) of claim 11, wherein the operating characteristics of the mobile unit (20, 22, 24) may be adjusted and the mobile unit (20, 22, 24) includes:

a third reader, which refers to said regulations corresponding to said single geographic region; and
an operating characteristics adjuster, which adjusts the operating characteristics of the mobile unit (20, 22, 24) to comply with said regulations.

13. The mobile unit (20, 22, 24) of any of claims 9-12, further comprising:

a frequency scanner, which scans the frequency spectrum until an announcement message from an access point (12, 14) is detected;
a frequency characteristics detector, which examines the frequency characteristics of said announcement message;
a comparator, which compares said frequency characteristics with a table in a memory of said mobile unit (20, 22, 24);
a determiner, which determines the geographic region by matching said frequency characteristics with a geographic region listed in said table, said table also listing a frequency range for each geographic region; and
a frequency adjuster, which adjusts the operating frequency range of the mobile unit (20, 22, 24) to correspond with said frequency range corresponding to the geographic region.

14. The mobile unit (20, 22, 24) of any of claims 9-13 wherein the mobile unit (20, 22, 24) is a hand-held data gathering unit.

15. The mobile unit (20, 22, 24) of any of claims 9-14, further including:

a display;
a display transmitter, which sends a message to said display so that a user may verify that the geographic region determined by the mobile unit (20, 22, 24) is correct; and
a wireless transmitter, which transmits only if said user verifies that the geographic region determined by the mobile unit (20, 22, 24) is correct.

16. The mobile unit (20, 22, 24) of any of claims 9-15, further including:

a Global Positioning System locator, which verifies the geographic region in which the mobile unit (20, 22, 24) is located; and
a wireless transmitter, which transmits only if said Global Positioning Sensor locator verifies that the geographic region determined by the mobile unit (20, 22, 24) is equivalent to the geographic region in which the mobile unit (20, 22, 24) is located.

17. The mobile unit (20, 22, 24) of any of claims 9-16, further including means for disabling the multiple geographic region feature by a user.

Patentansprüche

1. Verfahren zum Betreiben eines drahtlosen Daten Kommunikations-Netzwerks, das eine Mobileinheit (20, 22, 24) und einen oder mehrere Zugangspunkte (12, 14) aufweist, wobei das Verfahren die folgenden Schritte aufweist:

Empfangen von Benachrichtigungen in der Mobileinheit (20, 22, 24), die verbreitet werden durch einen oder mehrere der Zugangspunkte (12, 14), wobei jede dieser Nachrichten eine eindeutige Frequenzcharakteristik aufweist, die assoziiert ist mit der geographischen Position des Zugangspunktes (12, 14) von dem sie gesendet wurde;
Bestimmen eines erlaubten Frequenzsatzes in der Mobileinheit (20, 22, 24) innerhalb der geographischen Region, die assoziiert ist mit dem Zugangspunkt (12, 14) von dem jede der Nachrichten gesendet wurde; und
Abstimmen des Frequenzsatzes der Mobileinheit (20, 22, 24), um Nachrichten auf dem erlaubten Frequenzsatz zu senden, wobei der genannte Schritt des Bestimmens die folgenden Schritte aufweist:

Vergleichen der eindeutigen Frequenzcharakteristik der Nachrichten mit einer Tabelle, die gespeichert ist in einem Speicher der Mobileinheit (20, 22, 24), wobei die Tabelle eine Liste von verschiedenen Frequenzsätzen enthält entsprechend verschiedener geographischer Regionen;
Anpassen der eindeutigen Frequenzcharakteristik an eine einzige geographische Region in der Tabelle; und
Zugreifen auf den erlaubten Frequenzsatz, der der einzigen geographischen Region entspricht,
dadurch gekennzeichnet, dass
die Tabelle des weiteren eine Liste von verschiedenen erlaubten Ausgangsleistungspegeln aufweist, die verschiedenen geographischen Regionen entsprechen, und
der Schritt des Bestimmens ferner die folgenden Schritte aufweist:

Zugreifen auf die erlaubten Ausgangsleistungspegel, die der einzigen geographischen Region entsprechen, und Abstimmen des Ausgangsleistungspegels der Mobileinheit (20, 22, 24) zum Betreiben dieser innerhalb der erlaubten Ausgangsleistungspegel.

2. Verfahren nach Anspruch 1, wobei die Tabelle ferner eine Liste von verschiedenen Regeln aufweist, die verschiedenen geographischen Regionen entsprechen.

3. Verfahren nach Anspruch 2, das ferner den folgenden Schritt aufweist:

Anzeigen der Regeln, und zwar einem Benutzer, die einer geographischen Region entsprechen in der sich die Mobileinheit (20, 22, 24) befindet.

4. Verfahren nach Anspruch 3, das ferner die folgenden Schritte aufweist:

Zugreifen auf die Regeln, die der einzigen geographischen Region entsprechen, und
Abstimmen der Betriebscharakteristik der Mobileinheit (20, 22, 24), um diesen Regeln zu genügen.

5. Verfahren nach einem der vorhergehenden Ansprüche, das ferner die folgenden Schritte aufweist:

Scannen des Frequenzspektrums bis eine Benachrichtigung eines Zugangspunktes (12, 14) detektiert wird;
Prüfen der Frequenzcharakteristik der Benachrichtigung;
Vergleichen der Frequenzcharakteristik mit einer Tabelle in einem Speicher in der Mobileinheit (20, 22, 24);
Bestimmen der geographischen Region durch Abgleichen der Frequenzcharakteristik mit einer geographischen Region, die in der Tabelle aufgelistet ist, wobei die Tabelle außerdem einen Frequenzbereich für jede geographische Region auflistet; und
Abstimmen des Betriebsfrequenzbereichs der Mobileinheit (20, 22, 24), um dem Frequenzbereich entsprechend der geographischen Region zu entsprechen.

6. Verfahren nach einem der vorhergehenden Ansprüche, das ferner die folgenden Schritte aufweist:

Senden einer Nachricht an einen Benutzer zum Verifizieren, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde, korrekt ist; und
Übertragen, nur dann, wenn der Benutzer bestätigt, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde, korrekt ist.

7. Verfahren nach einem der vorhergehenden Ansprüche, das ferner die folgenden Schritte aufweist:

Benutzen eines globalen Positionsbestimmungssystems zum Verifizieren der geographischen Region in der sich die Mobileinheit (20, 22, 24) befindet;
Übertragen, nur dann, wenn das globale Positionsbestimmungssystem bestätigt, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde äquivalent ist zu der geographischen Region in der sich die Mobileinheit (20, 22, 24) befindet.

8. Verfahren nach einem der vorhergehenden Ansprüche, wobei ein Benutzer die Funktion, welche das Verfahren ausführt abschalten kann.

9. Mobileinheit (20, 22, 24) zum Benutzen in einem drahtlosen Daten Kommunikations-Netzwerk, das einen oder mehrere Zugangspunkte (12, 14) aufweist, wobei der Frequenzsatz der Mobileinheit (20, 22, 24) abgeändert werden kann und die Mobileinheit (20, 22, 24) folgendes aufweist:

einen Empfänger zum Empfangen von Benachrichtigungen in der Mobileinheit (20, 22, 24), die verbreitet werden durch einen oder mehrere der Zugangspunkte (12, 14), wobei jede dieser Nachrichten eine eindeutige Frequenzcharakteristik aufweist, die assoziiert ist mit der geographischen Position des Zugangspunktes (12, 14) von dem sie gesendet wurde;
eine Verarbeitungseinheit zum Bestimmen eines erlaubten Frequenzsatzes innerhalb der geographischen Region, die assoziiert ist mit dem Zugangspunkt (12, 14) von dem jede der Nachrichten gesendet wurde; und
einen Frequenzsatzabstimmer zum Abstimmen des Frequenzsatzes, um Nachrichten auf dem erlaubten Frequenzsatz zu senden,

wobei die Verarbeitungseinheit folgendes aufweist:

einen Vergleicher zum Vergleichen der eindeutigen Frequenzcharakteristiken der Nachrichten mit einer Tabelle, die gespeichert ist in einem Speicher der Mobileinheit (20, 22, 24), wobei die Tabelle eine Liste von verschiedenen, erlaubten Frequenzsätzen enthält entsprechend verschiedener geographischer Regionen;
einen Anpasser zum Anpassen der eindeutigen

Frequenzcharakteristik an eine einzige geographische Region in der Tabelle; und
einen ersten Leser zum Zugreifen auf den erlaubten Frequenzsatz, der der einzelnen geographischen Region entspricht, **dadurch gekennzeichnet, dass**
die Tabelle, ferner eine Liste verschiedener erlaubter Ausgangsleistungspegel aufweist, die verschiedenen geographischen Regionen entsprechen, und wobei der Ausgangsleistungspegel der Mobileinheit (20, 22, 24) abstimmbar ist und die Mobileinheit (20, 22, 24) ferner folgendes aufweist:

einen zweiten Leser zum Zugreifen auf die erlaubten Ausgangsleistungspegel, die der einzigen geographischen Region entsprechen; und
einen Ausgangsleistungspegel-Abstimmer, zum Abstimmen des Ausgangsleistungspegels der Mobileinheit (20, 22, 24) zum Betreiben dieser innerhalb der erlaubten Ausgangsleistungspegel.

10. Mobileinheit (20, 22, 24) nach Anspruch 9, wobei die Tabelle ferner eine Auflistung aufweist von verschiedenen Regeln, die verschiedenen geographischen Regionen entsprechen.

11. Mobileinheit (20, 22, 24) nach Anspruch 10, die ferner ein Display aufweist, das einem Benutzer die Regeln entsprechend der verschiedenen geographischen Regionen in denen sich die Mobileinheit (20, 22, 24) befindet, anzeigt.

12. Mobileinheit (20, 22, 24) nach Anspruch 11, wobei die Betriebscharakteristik der Mobileinheit (20, 22, 24) abgestimmt werden kann und die Mobileinheit (20, 22, 24) ferner folgendes aufweist:

einen dritten Leser, der auf die Regeln verweist, die der einzelnen geographischen Region entsprechen; und
einen Betriebscharakteristik-Abstimmer, der die Betriebscharakteristik der Mobileinheit (20, 22, 24) so abstimmt, dass sie den Regeln genügt.

13. Mobileinheit (20, 22, 24) nach einem der Ansprüche 9-12, die ferner folgendes aufweist:

einen Frequenzabtaster, der das Frequenzspektrum abtastet bis eine Benachrichtigung von einem Zugangspunkt (12, 14) detektiert wird; einen Frequenzcharakteristik-Detektor, der die Frequenzcharakteristik der Benachrichtigung prüft;
einen Vergleicher, der die Frequenzcharakteristik mit einer Tabelle in einem Speicher der Mobileinheit (20, 22, 24) vergleicht;
einen Bestimmer, der die geographische Region durch Anpassen der Frequenzcharakteristik mit der geographischen Region, die in der Tabelle aufgelistet ist bestimmt, wobei die Tabelle außerdem einen Frequenzbereich für jede geographische Region auflistet; und
einen Frequenzabstimmer, der den Betriebsfrequenzbereich der Mobileinheit (20, 22, 24) so abstimmt, damit diese dem Frequenzbereich entspricht, der der geographischen Region entspricht.

14. Mobileinheit (20, 22, 24) nach einem der Ansprüche 9-13, wobei die Mobileinheit (20, 22, 24) eine handgehaltene Datenerfassungseinheit ist.

15. Mobileinheit (20, 22, 24) nach einem der Ansprüche 9-14, die ferner folgendes aufweist:

ein Display;
einen Display-Sender, der eine Nachricht an das Display sendet, damit ein Benutzer verifizieren kann, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde, korrekt ist; und
einen drahtlosen Sender, der nur dann sendet, wenn der Benutzer bestätigt, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde, korrekt ist.

16. Mobileinheit (20, 22, 24) nach einem der Ansprüche 9-15, die ferner folgendes aufweist:

ein globales Positionsbestimmungssystem, das die geographische Region verifiziert, in der sich die Mobileinheit (20, 22, 24) befindet; und
einen drahtlosen Sender, der nur dann sendet, wenn das globale Positionsbestimmungssystem bestätigt, dass die geographische Region, die von der Mobileinheit (20, 22, 24) bestimmt wurde, äquivalent ist mit der geographischen Region, in der sich die Mobileinheit (20, 22, 24) befindet.

17. Mobileinheit (20, 22, 24) nach einem der Ansprüche 9-16, die ferner Mittel aufweist zum Abschalten der Funktion mehrfacher geographischer Regionen durch den Benutzer.

Revendications

1. Procédé pour actionner un réseau de communication de données sans fil comprenant un poste mobile (20, 22, 24) et un ou plusieurs points d'accès (12, 14), le procédé comprenant les étapes suivantes :

recevoir dans le poste mobile (20, 22, 24) des messages d'annonce diffusés par un ou plusieurs des points d'accès (12, 14), chacun des messages ayant une caractéristique de fréquence spécifique associée à l'emplacement géographique du point d'accès (12, 14) à partir duquel il a été envoyé ;
déterminer, dans le poste mobile (20, 22, 24), un ensemble de fréquences autorisé dans la région géographique associée au point d'accès (12, 14) à partir duquel chacun des messages a été envoyé ; et régler l'ensemble de fréquences du poste mobile (20, 22, 24) pour envoyer des messages sur l'ensemble de fréquences autorisé,

dans lequel l'étape de détermination comprend les étapes suivantes :

comparer les caractéristiques de fréquence spécifiques des messages à une table mémorisée dans une mémoire du poste mobile, la table contenant une liste de divers ensembles de fréquences autorisés pour correspondre à différentes régions géographiques ;
faire concorder les caractéristiques de fréquence spécifiques avec une unique région géographique de la table ; et
faire référence à l'ensemble de fréquences autorisé correspondant à la région géographique unique,
caractérisé en ce que
la table comprend en outre une liste de divers niveaux de puissance de sortie autorisés correspondant aux différentes régions géographiques, et

l'étape de détermination comprend en outre les étapes suivantes :

faire référence aux niveaux de puissance de sortie autorisés correspondant à la région géographique unique ; et
régler le niveau de puissance de sortie du poste mobile (20, 22, 24) pour fonctionner dans les niveaux de puissance de sortie autorisés.

2. Procédé selon la revendication 1, dans lequel la table comprend en outre une liste de diverses réglementations correspondant aux différentes régions géographiques.

3. Procédé selon la revendication 2, comprenant en outre l'étape suivante :

afficher pour un utilisateur les réglementations correspondant à la région géographique dans laquelle le poste mobile (20, 22, 24) est situé.

4. Procédé selon la revendication 3, comprenant en outre les étapes suivantes :

faire référence aux réglementations correspondant à la région géographique unique ; et
régler les caractéristiques fonctionnelles du poste mobile (20, 22, 24) pour respecter lesdites réglementations.

5. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre les étapes suivantes :

balayer le spectre de fréquences jusqu'à ce qu'un message d'annonce en provenance d'un point d'accès (12, 14) soit détecté ;
examiner les caractéristiques de fréquence du message d'annonce ;
comparer les caractéristiques de fréquence à une table en mémoire dans le poste mobile (20, 22, 24) ;
déterminer la région géographique en faisant concorder les caractéristiques de fréquence avec une région géographique listée dans la table, la table listant aussi une plage de fréquence pour chaque région géographique ; et
régler la plage de fréquence de fonctionnement du poste mobile (20, 22, 24) pour correspondre à la plage de fréquence correspondant à la région géographique.

6. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre les étapes suivantes :

envoyer un message à un utilisateur pour vérifier que la région géographique déterminée par le poste mobile (20, 22, 24) est correcte ; et
émettre seulement si l'utilisateur vérifie que la région géographique déterminée par le poste mobile (20, 22, 24) est correcte.

7. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre les étapes suivantes :

utiliser un dispositif de localisation du Système de Positionnement Global pour vérifier dans quelle région géographique est situé le poste mobile (20, 22, 24) ;
émettre seulement si le dispositif de localisation du Système de Positionnement Global vérifie que la région géographique déterminée par le poste mobile (20, 22, 24) est équivalente à la région géographique dans laquelle le poste mobile (20, 22, 24) est situé.

8. Procédé selon l'une quelconque des revendications

précédentes, dans lequel un utilisateur peut désactiver la fonctionnalité qui exécute le procédé.

9. Poste mobile (20, 22, 24) pour utilisation dans un réseau de communications de données sans fil comprenant un ou plusieurs points d'accès (12, 14), dans lequel l'ensemble de fréquences du poste mobile (20, 22, 24) peut être modifié et dans lequel le poste mobile (20, 22, 24) comprend :

un récepteur pour recevoir dans le poste mobile (20, 22, 24) des messages d'annonce diffusés par un ou plusieurs des points d'accès (12, 14), chacun des messages ayant une caractéristique de fréquence spécifique associée à la position géographique du point d'accès (12, 14) à partir duquel il a été envoyé ;
un module de traitement pour déterminer un ensemble de fréquences autorisé dans la région géographique associée au point d'accès (12, 14) à partir duquel chacun des messages a été envoyé ; et
un dispositif de réglage d'ensemble de fréquences pour régler l'ensemble de fréquences pour envoyer des messages sur l'ensemble de fréquences autorisé,

dans lequel le module de traitement comprend :

un comparateur pour comparer les caractéristiques de fréquence spécifiques des messages à une table mémorisée dans une mémoire du poste mobile (20, 22, 24), la table contenant une liste de divers ensembles de fréquences autorisés pour correspondre à différentes régions géographiques ;
un dispositif de recherche de concordance pour rechercher une concordance entre les caractéristiques de fréquence spécifiques et une seule région géographique de la table ; et
un premier lecteur pour faire référence à l'ensemble de fréquences autorisé correspondant à ladite région géographique spécifique,

caractérisé en ce que la table comprend en outre une liste de divers niveaux de puissance de sortie autorisés correspondant à différentes régions géographiques, et
le niveau de puissance de sortie du poste mobile (20, 22, 24) étant réglable et le poste mobile (20, 22, 24) comprenant :

un deuxième lecteur pour faire référence aux niveaux de puissance de sortie autorisés correspondant à la région géographique unique ; et
un dispositif de réglage de niveau de puissance de sortie pour régler le niveau de puissance de sortie du poste mobile (20, 22, 24) pour fonctionner dans les niveaux de puissance de sortie autorisés.

10. Poste mobile (20, 22, 24) selon la revendication 9, dans lequel la table comprend en outre une liste de diverses réglementations correspondant à différentes régions géographiques.

11. Poste mobile (20, 22, 24) selon la revendication 10, comprenant en outre un afficheur, qui affiche pour un utilisateur les réglementations correspondant à la région géographique dans laquelle le poste mobile (20, 22, 24) est situé.

12. Poste mobile (20, 22, 24) selon la revendication 11, dans lequel les caractéristiques de fonctionnement du poste mobile (20, 22, 24) peuvent être réglées et le poste mobile (20, 22, 24) comprend :

un troisième lecteur, qui fait référence aux réglementations correspondant à la région géographique unique ; et
un dispositif de réglage de caractéristiques de fonctionnement, qui règle les caractéristiques de fonctionnement du poste mobile (20, 22, 24) pour respecter les réglementations.

13. Poste mobile (20, 22, 24) selon l'une quelconque des revendications 9 à 12, comprenant en outre :

un analyseur de fréquences, qui balaye le spectre de fréquences jusqu'à ce qu'un message d'annonce provenant d'un point d'accès (12, 14) soit détecté ;
un détecteur de caractéristiques de fréquence, qui examine les caractéristiques de fréquence du message d'annonce ;
un comparateur, qui compare les caractéristiques de fréquence à une table dans une mémoire du poste mobile (20, 22, 24) ;
un dispositif de détermination, qui détermine la région géographique en faisant concorder les caractéristiques de fréquence avec une région géographique listée dans la table, la table listant aussi une plage de fréquences pour chaque région géographique ; et
un dispositif de réglage de fréquence, qui règle la plage de fréquences de fonctionnement du poste mobile (20, 22, 24) pour correspondre à la plage de fréquences correspondant à la région géographique.

14. Poste mobile (20, 22, 24) selon l'une quelconque des revendications 9 à 13, dans lequel le poste mobile (20, 22, 24) est un poste de collecte de données tenu à la main.

15. Poste mobile (20, 22, 24) selon l'une quelconque

des revendications 9 à 14, comprenant en outre :

un afficheur ;
un transmetteur d'affichage, qui envoie un message vers l'afficheur afin qu'un utilisateur puisse vérifier que la région géographique déterminée par le poste mobile (20, 22, 24) est correcte ; et
un émetteur sans fil, qui émet uniquement si l'utilisateur vérifie que la région géographique déterminée par le poste mobile (20, 22, 24) est correcte.

16. Poste mobile (20, 22, 24) selon l'une quelconque des revendications 9 à 15, comprenant en outre :

un dispositif de localisation du Système de Positionnement Global, qui vérifie la région géographique dans laquelle le poste mobile (20, 22, 24) est situé ; et
un émetteur sans fil, qui émet uniquement si le dispositif de localisation du Système de Positionnement Global vérifie que la région géographique déterminée par le poste mobile (20, 22, 24) est équivalente à la région géographique dans laquelle le poste mobile (20, 22, 24) est situé.

17. Poste mobile (20, 22, 24) selon l'une quelconque des revendications 9 à 16, comprenant en outre des moyens de désactivation par un utilisateur de la fonctionnalité de région géographique multiple.

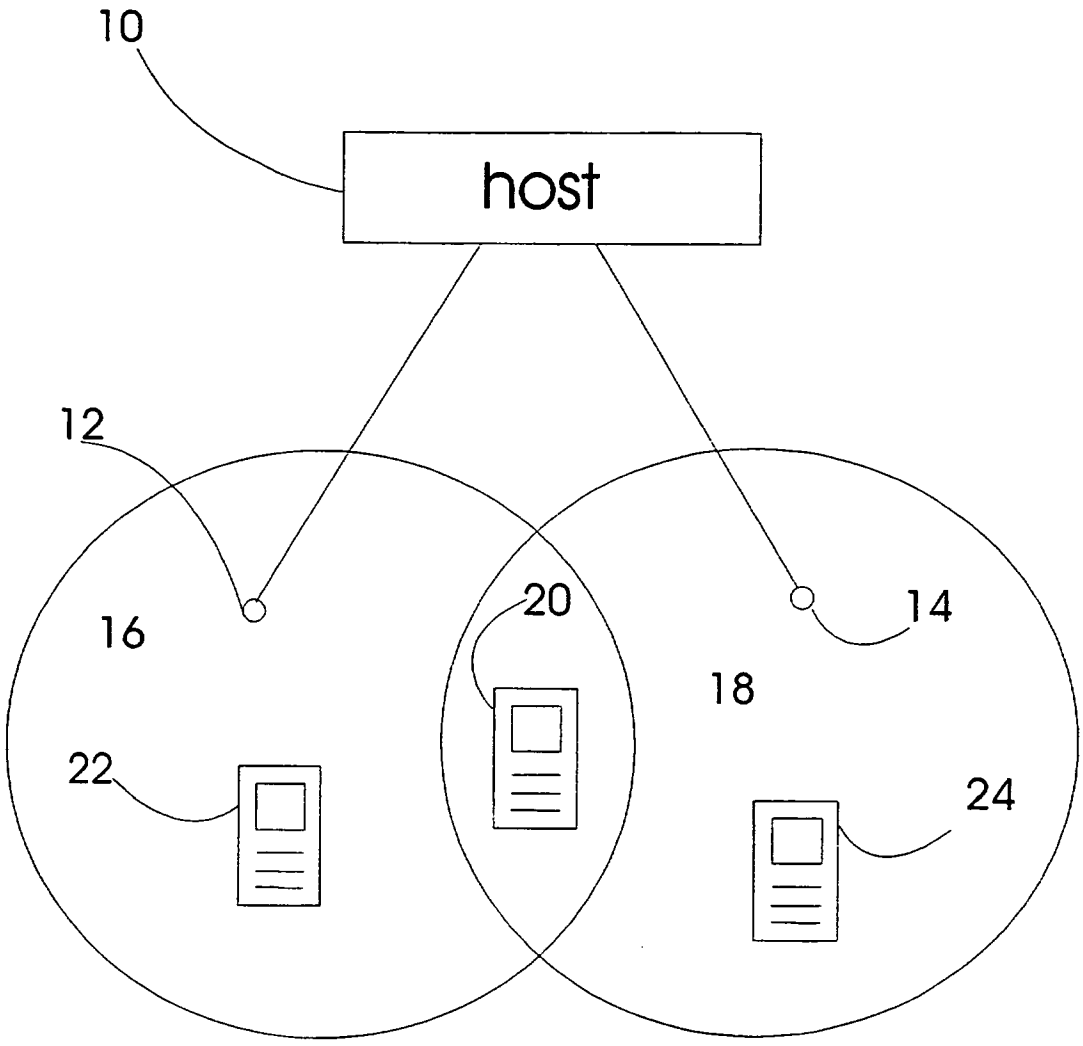


Fig. 1

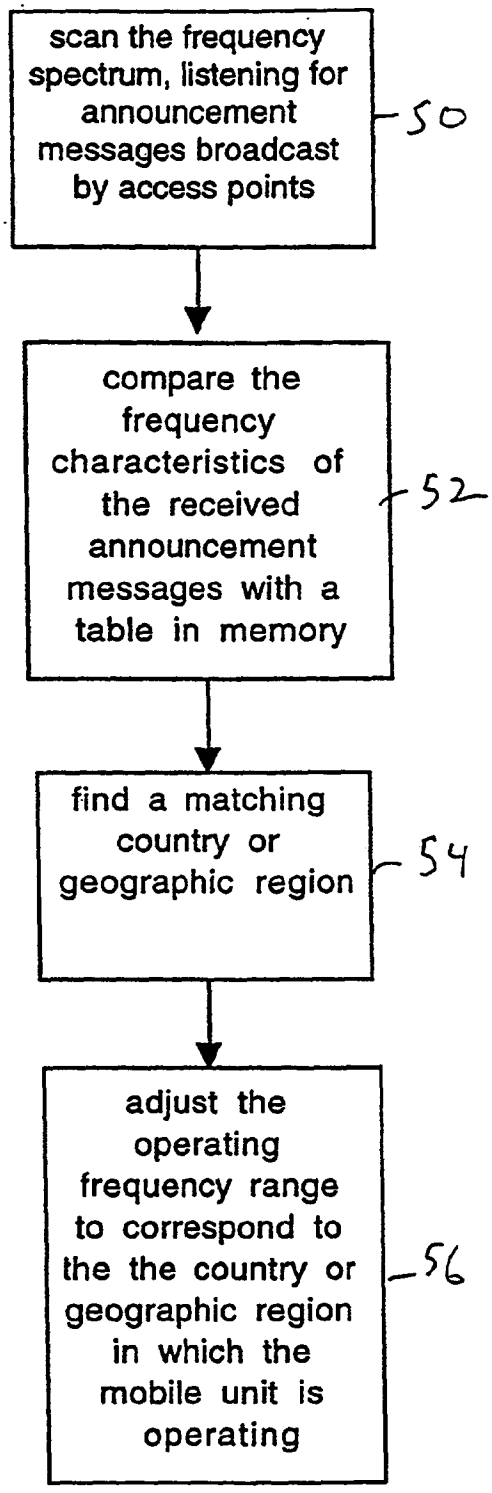

scan the frequency spectrum, listening for announcement messages broadcast by access points
50
compare the frequency characteristics of the received announcement messages with a table in memory
52
find a matching country or geographic region
54
adjust the operating frequency range to correspond to the the country or geographic region in which the mobile unit is operating
56

Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2308946 A **[0005]**
- US 5613204 A **[0006]**
- US 5701328 A **[0007]**
- US 5901358 A **[0008]**
- WO 9717623 A **[0008]**
- US 5924034 A **[0009]**
- US 5787354 A **[0010]**
- US 5029183 A, Tymes **[0025]**
- US 5668803 A, Tymes **[0025]**

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(54) Coexistence techniques in wireless networks

(57) Techniques are provided for frequency coordination among two different wireless network protocols, such as the IEEE 802.11 and Bluetooth protocols, operating in proximity with one another. Coordination is accomplished by the use of a first radio transceiver operating in accordance with a first communication protocol (which may be the 802.11 protocol) and using a frequency band (which may be the 2.4 GHz band), a base station connected to a wired network and operating in accordance with the first communication protocol, a second radio transceiver operating in accordance with a second communication protocol (which may be the Bluetooth protocol) and using the frequency band, and a coordinator associated with the base station for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

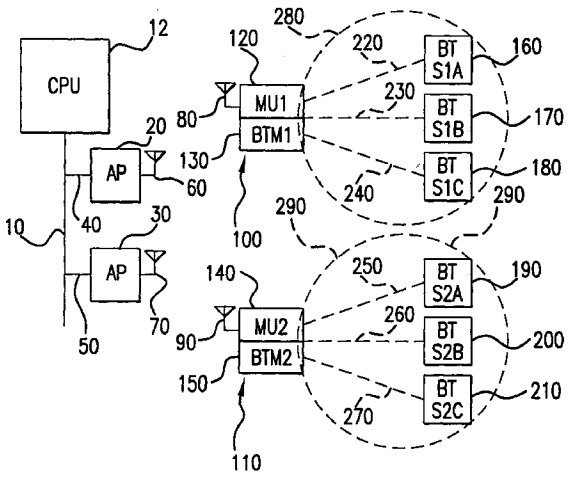


FIG.1

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Description

BACKGROUND OF THE INVENTION

[0001] This application claims the benefit of provisional applications Serial No. 60/175,262, filed January 10, 2000 and Serial No. 60/196,979, filed April 13, 2000. This invention relates to wireless data communications networks, and in particular to arrangements for ensuring coexistence between wireless networks that share the same frequency band with different operating protocols.

[0002] Wireless devices communicate with one another using agreed-upon protocols that are transmitted in predefined frequency bands. Often, devices using one or more wireless protocols may operate by transmission within the same frequency band. It is therefore necessary to develop coordination techniques in order for devices using one or more wireless protocols to efficiently operate in the same band of frequencies at the same time.

[0003] For example, the assignee of the present invention supplies wireless data communications systems known as the Spectrum 24® System that follows the communications protocol of IEEE 802.11 Standard (802.11), which is hereby incorporated by reference. In the system as implemented, mobile units (MUs) are in data communication with a central computer through one or more access points (APs). The APs may communicate with a computer directly or over an Ethernet wired network. Each of the MUs associates itself with one of the APs. As defined in 802.11, this communications protocol uses the 2.4 GHz ISM frequency band.

[0004] As currently designed, 802.11 devices may use several predefined methods for transmission within the 2.4 GHz band to perform as a wireless local area network. One method is to use a frequency hopping spread spectrum (FHSS) mechanism wherein data is transmitted for a certain period of time in a particular channel and, following a pseudorandom sequence, continues transmission at a different channel for the same predetermined length of time. As currently designed, 802.11 devices operate at a frequency hopping rate of 10 hops/second. Another method is to use a direct sequence spread spectrum (DSSS) mechanism wherein the data is transmitted in a predetermined frequency channel and is multiplied by a pseudorandom chipping sequence during transmission.

[0005] As all 802.11 devices use the same ISM frequency band, interference among these devices is minimized by use of a Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA) protocol. Under CSMA/CA, an 8021.11 device listens for another's devices transmission prior to initiating its own transmission. If no other transmission is detected, the device transmits its information and waits for an acknowledgment (ACK) from the receiving device. If no acknowledgment of receipt is received after a pre-determined time interval, the device will retransmit after waiting for a randomly chosen interval of time. Thus, if two or more devices began transmitting coincidentally at the same time and the resulting interference blocks all of the transmissions, each device will wait a random amount of time to attempt a retransmission. This allows the devices to transmit at different times.

[0006] Another example of a wireless specification that also uses the 2.4 GHz ISM frequency band is Bluetooth™, which is designed for communication among devices within a short range transmitting at a lower power level. The Bluetooth specification is available at www.bluetooth.com. As currently designed, Bluetooth operates using a frequency hopping spread spectrum mechanism at a rate of 1600 hops/second. Bluetooth uses a master/slave system of communication. One example of a Bluetooth network may be a mobile device attached to the user's belt that communicates with a cordless scanner for reading bar codes and worn by the user as a ring. In this case, the mobile device would operate as the master and the cordless ring scanner would operate as the slave. In this system for data transmission, the master and slave only communicate at predefined intervals. At the first interval, the master may communicate to a first slave device, which may only respond during the second interval. At the third interval, a master may communicate to a second slave device, which may only respond during a fourth interval. By using this system, it is ensured that only one device within a particular Bluetooth "piconet" is transmitting at any particular time. Thus, interference is minimized.

[0007] Additionally, it is desirable for one Bluetooth piconet to operate in close proximity with another, separate Bluetooth piconet. Because there are 79 different frequency channels used by Bluetooth, different Bluetooth networks are unlikely to be operating on the same frequency at the same time. Interference between the separate Bluetooth piconets is thus minimized. This allows, for example, multiple individuals working in close proximity with one another to each have his or her own mobile unit along with a cordless ring scanner.

[0008] Along with the need to operate multiple networks of the same protocol in close proximity, there is also a recognized need in the art to coordinate the transmissions of devices operating under different protocols that use the same frequency band. For example, it may be desirable to use a cordless ring scanner that communicates with belt-mounted terminal using the Bluetooth protocol while the same belt mounted terminal communicates with an access point using the 802.11 protocol. For example, once the user scans a bar code using the cordless ring scanner, the bar code information may be sent to the belt-mounted terminal. That bar code information may then be transmitted to the 802.11 AP. Then an acknowledgment, and possibly a message, may need to be sent from the AP back to the belt-mounted terminal. The terminal may also need to communicate with other Bluetooth enabled peripherals like a printer or a headset. Although communication protocols

such as 802.11 and Bluetooth are designed to ensure that devices using the same protocol may operate in the same frequency band with a minimum of interference, there has heretofore been no method of coordination for the use of these wireless devices in the same frequency operating under different communication protocols.

[0009] It is additionally desirable to provide voice service using the Bluetooth communications protocol, for example, between a belt-mounted terminal and a headset worn by the user. Bluetooth supports voice communications using Synchronous Connection Oriented (SCO) voice packets which are transmitted every 3.75 ms. The requirement for such frequent Bluetooth packet transmission makes it difficult to coordinate voice transmission using the Bluetooth SCO packets with 802.11 communications.

[0010] It is therefore an object of this invention to utilize coordination techniques to ensure that, for example, both Bluetooth and 802.11 enabled devices, may operate robustly in the same frequency band at the same time.

SUMMARY OF THE INVENTION

[0011] An embodiment of the present invention includes a first radio transceiver operating in accordance with a first communication protocol (which may be the 802.11 protocol) and using a frequency band (which may be the 2.4 GHz ISM band), a base station operating in accordance with the first communication protocol, a second radio transceiver operating in accordance with a second communication protocol (which may be the Bluetooth protocol) and using the frequency band, and a coordinator associated with the base station for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

[0012] The first radio transceiver and the second radio transceiver may be mounted together in a housing, which may be suitable for wearing on a belt or a laptop computer or a PDA. One or more slave devices may be associated with the second transceiver and operate in accordance with the second communication protocol. The slave devices may include a scanner, worn on a user's finger and capable of transmitting bar code information to the second transceiver, a printer, or a personal data managing device.

[0013] In one arrangement wherein the first and second transceivers are mounted together in a housing, they may include orthogonally polarized antennas. In another arrangement a Bluetooth protocol transceiver transmits at power level of about 0 dBm. In still another arrangement, two or more sub bands within the frequency band are provided and the 802.11 protocol transceiver uses one of the two or more sub-bands and the Bluetooth protocol transceiver uses another of the two or more sub-bands. In still another arrangement in the second radio transceiver is equipped with a look-ahead function for determining whether two or more sub-bands are being used by the first radio transceiver that will also be used by the second transceiver. In still another arrangement, a coordinator is associated with the first radio transceiver for deactivating the second radio transceiver while the first radio transceiver is in use.

[0014] According to the invention, there is provided a method for operating a portable data communications device using first and second wireless data communications protocol. The data communications device is operated in a power saving mode of the first communication protocol, whereby the device has active time periods for transmitting and receiving data communications signals using the first communications protocol and dormant time periods during which the device neither transmits nor receives data communications signals using the first protocol. The data communications device is operated as a master device according to the second communications protocol whereby the data communication device controls operation of slave devices communicating therewith. The operation according to the second data communications protocol is controlled to operate only during the dormant time periods of the first protocols.

[0015] In one embodiment, a signal indicating that the active time period will commence following a predetermined time interval is provided to terminate operation according to the second data communication protocol during the predetermined time interval. The first wireless data communications protocol may be the 802.11 protocol. The second wireless communication protocol may be Bluetooth.

[0016] In another aspect of the invention, there is provided a method for operating a wireless data communications system having an access point and at least one mobile unit associated with said access point using a first wireless protocol (which may be 802.11), wherein said mobile unit is arranged to conduct wireless data communications with other units using a second wireless protocol (which may be Bluetooth). Periodic beacon signals are transmitted from the access point according to the first wireless protocol. Global clear to send signals are transmitted from the access point according to the first wireless protocol, whereby the global clear to send signals prevent mobile units from transmitting signals using the first data communications protocol during an allocated time interval within the beacon signal period. The access point is controlled to avoid transmissions during the allocated time interval, and the mobile unit is operated in response to the global clear to send signal to conduct wireless communications acting as a master unit using the second wireless protocol during the allocated time interval.

[0017] In one embodiment, the beacon signal period is divided into three time intervals, wherein the access point conducts power saving mode data communications during a first time interval, wherein the access point conducts data communications using the second com-

munications protocol during the second time interval and wherein the access point conducts data communications using the first wireless protocol during a third time interval. The first time interval may immediately following the beacon signal. In another embodiment, the first time interval may not be utilized.

[0018] In accordance with another aspect of the invention, there is provided a method of operating a data communications system using a master-slave protocol (such a Bluetooth), wherein a master transceiver transmits to slave units during first even time slots and wherein slave units transmit to the master unit during odd time slots, and wherein the transmissions follow a predetermined frequency hop pattern at a hop rate corresponding to the time slots. The master unit is operated during a first time period of each time slot to detect interfering signals at a frequency corresponding to the following time slot. Transmission by the master transceiver is inhibited during even time slots if interfering signals have been detected during either of the current or previous time slots.

[0019] In a preferred practice, the operating step includes tuning the master unit to receive signals corresponding to the frequency allocated to the next following time slot; detecting the strength of signals received and retuning the master unit to send or receive signals corresponding to the frequency allocated to the current time slot.

[0020] In another aspect of the invention, there is provided a method for providing voice communications in a wireless data communications system having a mobile unit arranged to communicate with an access point using a first data communications protocol (such as 802.11) and arranged to communicate with other devices using a second data communications protocol (such as Bluetooth). Data corresponding to the voice communication is communicated between the access point and the mobile unit using the first data communications protocol. The data corresponding to the voice communications is communicated between the mobile unit and a portable device using the second data communication protocol. The communication is arranged at time intervals which avoid interference with the communicating using the first data communications protocol. Voice signals are converted to data corresponding to the voice signals and data signals corresponding to voice signal are converted into voice signals in the portable device.

[0021] In a preferred arrangement, the data corresponding to voice signals comprises compressed voice signal data. The communication between the mobile unit and the portable device preferably uses a Bluetooth ACL link.

[0022] According to a further aspect of the invention, there is provided a method for operating a mobile unit arranged to communicate using first and second data communication protocols operating in the same frequency band (such as 802.11 and Bluetooth) wherein the mobile unit associates with an access point and receives therefrom beacon signals demarcating time intervals according to the first communications protocol. Signals are received from the access point (such as CTS signals) designating a portion of one of the time intervals during which mobile units associated with the access point refrain from transmissions using said first data communications protocol. The mobile unit is operated as a master unit using the second data communications protocol to communicate with slave units during the designated portion of the time interval.

[0023] According to a further aspect of the invention, there is provided a method for operating a wireless data communications network having at least one access point and at least one mobile unit, including a mobile unit arranged to communicate with the access point using a first wireless data communication protocol (such as 802.11) in a first frequency band and to communicate with other devices using a second wireless data communication protocol (such as Bluetooth) in the first frequency band. Signals (such as CTS) as sent from the access point in the first communications protocol, which designate a time period wherein mobile units associated with the access point refrain from transmitting using the first data communications protocol. The mobile units operate as a master unit to conduct wireless data communications with the other devices operating as slave units using the second data communications protocol during the designated time period.

[0024] According to still another aspect of the invention, a method is provided for operating a mobile unit arranged to communicate using first and second data communications protocols operating in the same frequency band (such as 802.11 and Bluetooth), wherein the mobile unit associates with an access point. The mobile unit receives first and second control signals using the first data communications protocol. The mobile units are operated in response to the first control signals to act as a master unit and conduct data communications with slave units using the second data communications protocol. Communications by the mobile unit using the second data communications protocol is discontinued in response to the second control signal.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025]

Figure 1 is a block diagram of a wireless communications system using 802.11 and Bluetooth devices.

Figure 2 is a block diagram of a wireless communications system using 802.11 and Bluetooth devices at the same time along with a connect button switch and connected indicators.

Figure 3 is a schematic diagram of an embodiment of the present invention illustrating a coordinated time line between the operation of 802.11 and Bluetooth devices.

Figure 4 is a schematic diagram of an embodiment

of the present invention illustrating another coordinated time line between the operation of 802.11 and Bluetooth devices.

Figure 5 is a diagram showing a modified Bluetooth operating method for avoiding interference.

Figure 6 is a drawing showing one example of orthogonally polarized antennas.

Figure 7 is a drawing of a wireless headset arranged for voice communications.

Figure 8 is a block diagram of the headset of Figure 7.

DESCRIPTION OF THE INVENTION

[0026] Turning to Figure 1, shown are a plurality of base stations or Access Points (APs) 20, 30 that are physically connected 40, 50 to a wired network 10. While a wired network with multiple access points connected to a CPU 12 is a typical installation, the system may use a single computer and single AP. Each AP contains apparatus 60, 70 for the transmission and reception of radio frequency (RF) signals under the 802.11 protocol. Also using the 802.11 protocol, a plurality of radio transceivers or mobile units (MUs) 120, 140 communicate using apparatus 80, 90 for the transmission and reception of RF signals. Each MU 120, 140 may also be associated with a radio transceiver which is a Bluetooth Master (BTM) device 130, 150, which together make up a dual mode devices 100, 110. The association between the MU and BTM may be, for example, by way of being physically housed in the same unit. An example of a dual mode device 100, 110 may be portable terminal worn on a belt.

[0027] Each BTM 130, 150 communicates with one or more Bluetooth Slave (BTS) devices 160, 170, 180, 190, 200, 210 via the Bluetooth protocol. The Bluetooth protocol is established such that each BTS is uniquely associated with a BTM. Thus, as illustrated, BTSIA 160, BTS1B 170, and BTS1C 180 communicate using RF signals 220, 230, 240 only with BTM1 130. This forms a piconet 280. Correspondingly, BTS2A 190, BTS2B 200, and BTS2C 210 communicate using RF signals 250, 260, 270 with BTM2 150. This forms a piconet 290. An example of a BTS may be a cordless ring scanner, a printer, or personal data managing device.

[0028] With no coordination, there will be times when the BTM 130, 150 and the associated MU 120, 140 attempt to operate at the exact same time. Since the two devices operate in the same 2.4 GHz ISM frequency band the BTM 130, 150 and the MU 120, 140 may severely interfere with one another, especially if they are housed in a dual mode device 100, 110. Therefore, there is a need for coordination between the two devices. One such coordination scheme is primarily based on time multiplexing of the 802.11 and BT radios, which is especially suitable for a controlled environment (e.g., the 802.11 and BT radios are housed in the same terminal or dual mode device). In one embodiment, the Bluetooth systems are enabled or disabled according to a global/central signal from the 802.11 AP as described herein. The central signal may also be coordinated among the two devices without coordinating with the AP.

[0029] In a further embodiment, the dual mode devices 100, 110 may be designed such that the 802.11 antennas 80, 90 have orthogonal polarization with respect to the Bluetooth antennas used to generate RF signals 220, 230, 240, 250, 260, 270. This technique may provide additional protection from 802.11 Bluetooth interference and does not require the need for centralized control.

[0030] Figure 6 shows one example of orthogonally polarized antennas that can be used to reduce interference. The antenna structure of Figure 6 includes a vertically polarized monopole antenna 502, which is connected to a transmitter/receiver by an unbalanced transmission line 510. The structure also includes a horizontally polarized dipole antenna having dipole arms 504, 506 which are connected to a transmitter/receiver by balanced transmission line 508. Those skilled in the art will recognize that many other orthogonal-polarized antenna configurations may be used.

[0031] In a further embodiment, the BTMs 130, 150 may be designed to transmit at a relatively low power level such as lower than 0 dBm. This technique may provide additional protection from 802.11 Bluetooth interference and may be used with other antenna or frequency coordination methods discussed herein.

[0032] In a further embodiment, the 802.11 APs 20, 30 and MUs 120, 140 may be designed to operate in one portion of the 2.4 GHz spectrum, while the BTMs 130, 150 and BTSs 160, 170, 180, 190, 200, 210 may be designed to operate in another portion of the 2.4 GHz spectrum.

[0033] In a further embodiment, the BTMs 130, 150 may be equipped with a look-ahead function to determine which frequencies within the 2.4 GHz band will be used for two or more future Bluetooth frequency hops to occur. If the BTM 130, 150 determines that one of the next two or more frequency hops will use the same frequency that the 802.11 system is using, the BTMs 130, 150 will blank their output, thus reducing the effect of the interference on the 802.11 transmissions. By using this method, interference between Bluetooth and 802.11 could be reduced or eliminated at the expense of dropping a couple of packets when channel overlap occurs. This approach may also be expanded to include the blanking of adjacent channels that may also interfere with the 802.11 transmissions.

[0034] Bluetooth uses a Frequency Hopping Spread Spectrum (FHSS) radio, which hops much faster than most IEEE 802.11 radios. Bluetooth sends a short packet as it dwells on a given frequency. Most IEEE 802.11 radios hop much slower and send much longer packets. Also there are versions of IEEE 802.11 WLANs that use Direct Sequence Spread Spectrum (DSSS) which do not hop and occupy a wide band.

[0035] As a result, during the transmission of an IEEE 802.11 packet the Bluetooth radio hops across many frequencies and potentially sends a packet on each frequency. These Bluetooth packets can interfere with the IEEE 802.11 packets and cause the IEEE 802.11 packet to be in error. The IEEE 802.11 packet needs to be retransmitted, and once again may be destroyed by the signal from the Bluetooth radio.

[0036] This technique shown in Figure 5 can be used in any Bluetooth radio and in any device that will operate in an IEEE 802.11 WLAN environment. Since it detects devices radiating in the 2.4 GHz ISM band it could also be used to prevent interference with other devices in that band.

[0037] A Bluetooth network consists of up to eight Bluetooth devices operating in a piconet. The piconet has one master and up to seven slaves. All the Bluetooth devices in the piconet hop in unison, at a rate of 1600 hops/second. The time that the frequency hopper dwells on a given frequency is called the slot time. At this hop rate the slot time is 625 microseconds. Typically packets are completed within one slot time, however, it is also possible to have 3 and 5 slot packets. The master and the slaves take turns transmitting, with the master transmitting on even slots and the slaves transmitting on odd slots. See also Bluetooth Specification, version 1.0, December 1, 1999, which is hereby incorporated by reference in full.

[0038] There are two types of links between the master and each of the slave devices in a Bluetooth piconet. There is an asynchronous connection-less link (ACL) which is used to transfer data. There is also a synchronous connection oriented link (SCO) that is used to transfer voice data. The master in the picolink determines when data on an ACL link is transferred. Data is transferred when the master has data to send to a slave or the master wants to receive data from a slave.

[0039] Each Bluetooth device within a piconet frequency hops in unison, according to a pseudo random sequence. Figure 5 illustrates a device hopping along its sequence of frequencies: f(1), f(2), ... f(n) ... The figure also shows how the 625-microsecond slot time includes a 220-microsecond period for tuning the frequency synthesizer in the radio to a new frequency and a 405-microsecond data transmission period.

[0040] As stated above during even slots T(f) the master transmits to a slave and during odd slots R(f) the slave transmits back to the master. The master can transmit on any even time slot. The slave can only transmit to the master in a time slot if the master sent the slave a packet in the previous time slot. If the master does not send data to any slave in slot n then no slave can transmit in slot (n+1). The exception to this rule is for SCO link packets in which data is always transmitted in predefined periodic intervals. So for ACL links if the master does not transmit any data, the slaves do not send any data.

[0041] Currently the piconet master does not attempt to determine if any other devices are using the spectrum before it transmits. As a result, if there is an IEEE 802.11 packet currently being transmitted the Bluetooth master will not bother to check to see if this other system is transmitting and will itself transmit at the same time, and possibly on the same frequency. As a result it will interfere with the IEEE 802.11 packet possibly causing the packet to be received incorrectly.

[0042] It is proposed to subdivide the 220 microsecond tuning time interval into several subintervals and to spend some of that time looking ahead into subsequent frequencies to see if there is any other devices transmitting in those channels. The reason to look ahead is that if the a master sends a message to slave #1 on frequency f(n), then the master has cleared slave #1 to transmit during the next time slot on frequency f(n+1). Therefore, the master needs to look ahead to the frequency that corresponds to the next slot. The 220 microsecond timing interval can be subdivided as follows. In the first 80 microseconds the frequency synthesizer in the master retunes to f(n+1), then in the next 60 microseconds the master listens for any signal in that band. This can be done using a standard Receive Strength Signal Indicator (RSSI) in the radio. Then in the next 80 microseconds the frequency synthesizer then retunes the radio to f(n). Figure 5 illustrates the new proposed time slot subdivision.

[0043] Just prior to receiving on frequency f(n-1) the master checks to see that the frequency band at f(n) is clear. Also, prior to transmitting on frequency f(n) the master also makes sure that the frequency band f(n) is clear. If frequency bands f(n) and f(n+1) are clear then the master will transmit on frequency band f(n) and as a result allow the slave to transmit on frequency band f (n+1), in the next time slot.

[0044] During a time slot R the master likewise checks the frequency band that it will use to transmit in the following time interval. If that time slot is occupied, it will not transmit.

[0045] Referring now to the schematic of Figure 3 in conjunction with the physical layout shown in Figure 1. There is shown another technique to coordinate transmissions. Every 802.11 beacon time period, T 300, may be divided into three time intervals: 802.11 communications in the power saving (PSP) mode - $t_{802.11PSP}$ 310, Bluetooth communications - t_{NAV} 320, and 802.11 communications in the active mode CAM - $t_{802.11CAM}$ 330. The duration of time intervals T, t802.11IPSP, t_{NAV}, and $t_{802.11CAM}$ depend on traffic characteristics and application needs (e.g., time critical services). At the beginning of each beacon period 300, AP 20 sends a beacon signal 350 to the 802.11 PSP MU's 120, 140 that wake up in this period (some PSP MU's may wake up in a different beacon). During this period the PSP MU's 120, 140 receive and transmit their packets according to the 802.11 protocol. Once all the PSP MU's 120, 140 receive their packets, the AP 20, may optionally send a global Clear to Send (CTS) signal 430 to shut down all

the 802.11 communications for a NAV (Network Allocation Vector) period. At this point the 802.11 MUs 120, 140 will enable their associated BTMs 130, 150 (which may be housed in the same dual mode devices 100, 110) so the piconets 280, 290 associated with these BTMs 130, 150 may begin BT communications 360, 370. After completion of the NAV period 320 the BTM 130, 150 radios are disabled and all BT communications is ceased. The rest of the time (until the next beacon 380) is dedicated for 802.11 Continuously Aware Mode (CAM) MU's (not shown) that operate according to the 802.11 protocol.

[0046] In a further embodiment, the $t_{802.11PSP}$ 310 time interval may be eliminated if the MUs do not operate in PSP mode. Here, the CTS signal 340 would trigger only t_{NAV} 320 and $t_{802.11CAM}$ 330 time intervals for every 802.11 beacon period, T 300.

[0047] In a further embodiment, the $t_{802.11CAM}$ 330 time interval may be eliminated if the MUs do not operate in CAM mode. Here, the CTS signal 340 would trigger only t_{NAV} 320 and $t_{802.11PSP}$ 310 time intervals for every 802.11 beacon period, T 300.

[0048] In a further embodiment, the Bluetooth systems are enabled or disabled according to a global/central signal from the dual mode devices 100, 110 instead of from an AP 20.

[0049] A further embodiment of the present invention may be demonstrated by referring to the schematic of Figure 4 in conjunction with the physical layout shown in Figure 1. In this approach there is no need for the 802.11 APs to coordinate between Bluetooth and 802.11 transmission. Instead, the Bluetooth network operates in the ordinary course until a 802.11 MU instructs one or all of the Bluetooth masters to stop transmitting messages to the Bluetooth slaves. When using Asynchronous Connectionless (ACS) packets, the Bluetooth master controls access to the medium for its piconet. Thus, if the masters stops transmitting the slaves stop as well. Once the 802.11 MU has completed its communication, the Bluetooth masters are allowed to resume communicating with the Bluetooth slaves. This technique is especially useful when all the 802.11 MUs are in PSP mode, because these devices are in suspended mode during most of the time.

[0050] As shown in Figure 4, when the MU 120 desires to initiate 802.11 communication, its sends a STOP signal 400 to the BTMs 130, 150. The MU 120 then communicates 450 using the 802.11 protocol with the AP 20. When the MU 120 is finished communicating for the period $t_{802.11}$ 470 and is ready to resume its power save mode, the MU 120 communicates a START signal 410 to the BTMs 130, 150. The BTMs 130, 150 may then proceed to communicate 430, 440 using the BT protocol with their respective BTSs 160, 170, 190, 200 during the period t_{BT} 480. When the MU 120 802.11 terminal "wakes up" to either send data or to listen for a 802.11 beacon from the AP 20, the MU 120 sends a STOP signal 420 to the BTMs 130, 150 to inform then that the MU 120 is taking over access to the medium. The MU 120 may warn the BTMs 130, 150 before it needs exclusive use of the medium, and this warning may occur, for example, about 4 μsec before access is required. This allows the BTMs 130, 150 to complete several packet transfers and then stop communicating with their respective BTSs 160, 170, 190, 200. Subsequently the MU 120 may communicate 460 with the AP 20 for a new period $t_{802.11}$ 490.

[0051] In a further embodiment, the periods $t_{802.11}$ 490 and t_{BT} 480 are at fixed, predetermined intervals throughout the communications process. In a further embodiment, the periods $t_{802.11}$ 490 and t_{BT} 480 are equal length of time.

[0052] In a further embodiment, a BTS 160, 170, 180, 190, 200, 210 may be, for example, a headset or voice transmission device designed to transmit voice data to the BTMs 110, 130, which is then transmitted via the 802.11 network. Voice information is normally transmitted on a Bluetooth network using the periodic Synchronous Connection Oriented (SCO) protocol. This protocol is not conducive to the transmission interruptions required to coordinate with 802.11 operation. It would be more efficient, when using Bluetooth and 802.11, to transmit voice over the Bluetooth network using the ACL protocol that is normally reserved for data transmission. To use voice transmission over Bluetooth, when used in conjunction with the frequency coordination techniques disclosed herein, the Bluetooth piconet 280, 290 needs to compress and decompress the voice information in order to use the ACL protocol normally reserved for data transmissions.

[0053] Referring to Figures 7 and 8, there is shown a voice communication system 520 including a headset 521 having a BTS radio unit 210 which communicates with a dual mode mobile unit 110 using the BT protocol. The headset 521 includes an earphone in the same housing as radio unit 210 and a microphone 522. Mobile unit 110 may be arranged to be worn on the belt of a user. As shown in Figure 8, BTS 210 include microphone 522, earphone 524, and D to A and A to D converter 526 for converting sound signals to digital signals and vice versa. Digitized sound signals are compressed and arranged in packets in processor 528 and transmitted using RF module 530 and antenna 532. The reverse process is used for received signals. RF module 530 communicates with MU 110 using BT protocol in the ACL mode.

[0054] Another issue that results from attempts to coordinate 802.11 and Bluetooth devices is ensuring that the lower power Bluetooth devices are actually operating in conjunction with the higher power 802.11 devices. In this regard, a further embodiment of the present invention may be demonstrated by referring to Figure 2. Figure 2 is substantially similar to a portion of Figure 1, with the addition of a connect button 500 that provided on MUs 140 of the 802.11 network and light 540. The connect button 500, may be physically mounted on a

dual mode device 110. When activated by the user, the connect button 500 instructs the mobile units 140 to stop transmitting (timeout) for a preset amount of time. For example, the timeout could last for 10 seconds. This timeout would allow the Bluetooth piconet 290 to establish operations free from interference from 802.11 devices for the timeout period. Once established, the piconet 290 may activate light 540 to assure the user that the Bluetooth piconet 290 has in fact, been established. Once the timeout period ends, other methods for frequency coordination as described herein may be utilized.

[0055] While there have been described what are believed to be the preferred embodiments of the present invention, those skilled in the art will recognize that other changes and modifications may be made thereto without departing from the spirit of the present invention, and it is intended to claim all such changes and modifications as fall within the true scope of the invention.

1. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with a first communication protocol and using a frequency band;
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;
a coordinator associated with the base station for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

2. The apparatus of 1, wherein the frequency band is about 2.4 GHz.

3. The apparatus of 2, wherein the first communication protocol is the IEEE 802.11 protocol.

4. The apparatus of 3, wherein the second communication protocol is the Bluetooth protocol.

5. The apparatus of 4, wherein the first radio transceiver and the second radio transceiver are mounted together in a housing.

6. The apparatus of 5, wherein the housing is suitable for wearing on a belt.

7. The apparatus of 5, further comprising one or more slave devices associated with the second transceiver and operating in accordance with the second communication protocol.

8. The apparatus of 7 wherein at least one of the one or more slave devices is a scanner capable of being worn on a user's finger.

9. The apparatus of 8, wherein the scanner is capable of transmitting bar code information to the second transceiver.

10. The apparatus of 7, wherein at least one of the one or more slave devices is a printer.

11. The apparatus of 7, wherein at least one of the one or more slave devices is a personal data managing device.

12. The apparatus of 5, wherein the period between activating the first radio transceiver and deactivating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals.

13. The apparatus of 12, wherein the first time period and the second time period are of equal intervals.

14. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with a first communication protocol and using a frequency band,
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band, wherein the first radio transceiver and the second radio transceiver are mounted together in a housing;
a coordinator associated with the housing, for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

15. The apparatus of 14, wherein the frequency band is about 2.4 GHz.

16. The apparatus of 15, wherein the first communication protocol is the IEEE 802.11 protocol.

17. The apparatus of 16, wherein the second communication protocol is the Bluetooth protocol.

18. The apparatus of 14, wherein the period between activating the first radio transceiver and de-

activating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals.

19. The apparatus of 18, wherein the first time period and the second time period are of equal intervals.

20. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz and having a first antenna system;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz and having a second antenna system;

wherein the first antenna system and the second antenna system are of orthogonal polarization.

21. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the Bluetooth protocol transmission transmits at power level of about 0 dBm.

22. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the IEEE 802.11 protocol transceiver uses one of the two or more sub-bands and the Bluetooth protocol transceiver uses another of the two or more sub-bands.

23. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the second radio transceiver is equipped with a look-ahead function for determining whether the two or more sub-bands are being used by the first radio transceiver that will also be used by the second transceiver.

24. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with a first communication protocol and using a frequency band;
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;
a coordinator associated with the first radio transceiver for deactivating the second radio transceiver while the first radio transceiver is in use.

25. A method for operating a portable data communications device using first and second wireless data communications protocol comprising:

operating said data communications device in a power saving mode of said first communication protocol, whereby said device has active time periods for transmitting and receiving data communications signals using said first communications protocol and dormant time periods during which said device neither transmits nor receives data communications signals using said first protocol;
operating said data communications device as a master device according to said second communications protocol whereby said data communication device controls operation of slave

devices communicating therewith; and
controlling said operation according to said second data communications protocol to operate only during said dormant time periods.

26. A method as specified in 25 wherein said controlling comprises providing a signal indicating that said active time period will commence following a predetermined time interval and terminating operation according to said second data communication protocol during said predetermined time interval.

27. A method as specified in 25 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

28. A method as specified in 27 wherein said second wireless communication protocol is Bluetooth.

29. A method for operating a wireless data communications system having an access point and at least one mobile unit associated with said access point using a first wireless protocol, wherein said mobile unit is arranged to conduct wireless data communications with other units using a second wireless protocol, comprising:

transmitting periodic beacon signals from said access point according to said first wireless protocol;
transmitting global clear to send signals from said access point according to said first wireless protocol, said global clear to send signals preventing mobile units from transmitting signals using said first data communications protocol during an allocated time interval within said beacon signal period;
controlling said access point to avoid transmissions during said allocated time interval;
operating said mobile unit in response to said global clear to send signal to conduct wireless communications acting as a master unit using said second wireless protocol during said allocated time interval.

30. A method as specified in 29 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

31. A method as specified in 30 wherein said second wireless communication protocol is Bluetooth.

32. A method according to 29 wherein said beacon signal period is divided into three time intervals, and wherein said access point conducts power saving mode data communications during a first time interval, wherein said allocated time interval is a second time interval and wherein said access point conducts data communications using said first wireless protocol during a third time interval.

33. A method according to 32 wherein said first time interval is immediately following said beacon signal.

34. A method as specified in 32 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

35. A method as specified in 34 wherein said second wireless communication protocol is Bluetooth.

36. A method of operating a data communications system using a master-slave protocol, wherein a master transceiver transmits to slave units during first even time slots and wherein slave units transmit to said master unit during odd time slots, and wherein said transmissions follow a predetermined frequency hop pattern at a hop rate corresponding to said time slots, comprising:

operating said master unit during a first time period of each time slot to detect interfering signals at a frequency corresponding to the following time slot, and
inhibiting transmission by said master transceiver during even time slots if interfering signals have been detected during either of the current or previous time slots.

37. A method according to 36, wherein said operating step comprises tuning said master unit to receive signals corresponding to the frequency allocated to the next following time slot; detecting the strength of signals received and retuning said master unit to send or receive signals corresponding to the frequency allocated to the current time slot.

38. A method according to 37 wherein said protocol is Bluetooth.

39. A method for providing voice communications in a wireless data communications system having a mobile unit arranged to communicate with an access point using a first data communications protocol and arranged to communicate with other devices using a second data communications protocol, comprising:

communicating data corresponding to said voice communication between said access point and said mobile unit using said first data communications protocol;
communicating said data corresponding to said voice communications between said mobile unit and a portable device using said second data communication protocol, said communi-

cation being arranged at time intervals which avoid interference with said communicating using said first data communications protocol; and

converting voice signals to data corresponding to said voice signals and converting data signals corresponding to voice signal into voice signals in said portable device.

40. A method as specified in 39 wherein said data corresponding to voice signals comprises compressed voice signal data.

41. A method as specified in the 39 wherein said first communications protocol is the IEEE 802.11 protocol.

42. A method according to 41 wherein said second communication protocol is Bluetooth.

43. A method according to 42 wherein said communication between said mobile unit and said portable device uses a Bluetooth ACL link.

44. A method as specified in 43 wherein said data corresponding to voice signals comprises compressed voice signal data.

45. A method for operating a mobile unit arranged to communicate using first and second data communication protocols operating in the same frequency band wherein said mobile unit associates with an access point and receives therefrom beacon signals demarcating time intervals according to said first communications protocol, comprising:

receiving signals from said access point designating a portion of one of said time intervals during which mobile units associated with said access point refrain from transmissions using said first data communications protocol, and

operating said mobile unit as a master unit using said second data communications protocol to communicate with slave units during said designated portion of said time interval.

46. A method as specified in 45 wherein said first protocol is the IEEE 802.11 protocol.

47. A method as specified in 46 wherein said signals comprise CTS signals.

48. A method as specified in 47 wherein said second protocol is Bluetooth.

49. A method for operating a wireless data communications network having at least one access point and at least one mobile unit, including a mobile unit arranged to communicate with said access point using a first wireless data communication protocol in a first frequency band and to communicate with other devices using a second wireless data communication protocol in said first frequency band, comprising:

transmitting signals from said access point in said first communications protocol, said signals designating a time period wherein mobile units associated with said access point refrain from transmitting using said first data communications protocol; and

operating said mobile units as a master unit to conduct wireless data communications with said other devices operating as slave units using said second data communications protocol during said designated time period.

50. A method as specified in 49 wherein said first communications protocol is the IEEE 802.11 protocol.

51. A method as specified in 49 wherein said signals comprise CTS signals.

52. A method for operating a mobile unit arranged to communicate using first and second data communications protocols operating in the same frequency band, wherein said mobile unit associates with an access point, comprising:

receiving in said mobile unit first and second control signals using said first data communications protocol;

operating said mobile unit in response to said first control signals to act as a master unit and conduct data communications with slave units using said second data communications protocol; and

discontinuing communications by said mobile unit using said second data communications protocol in response to said second control signal.

53. A method as specified in 41 wherein said first protocol is the IEEE 802.11 protocol.

54. A method as specified in 42 wherein said signals comprise CTS signals.

Claims

1. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance

with a first communication protocol and using a frequency band;
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;
a coordinator associated with the base station for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

2. The apparatus of claim 1, wherein the frequency band is about 2.4 GHz,
and/ or wherein preferably the first communication protocol is the IEEE 802.11 protocol,
and/ or wherein preferably the second communication protocol is the Bluetooth protocol,
and/ or wherein preferably the first radio transceiver and the second radio transceiver are mounted together in a housing,
and/ or wherein preferably the housing is suitable for wearing on a belt.

3. The apparatus of claim 1 or 2, further comprising one or more slave devices associated with the second transceiver and operating in accordance with the second communication protocol.

4. The apparatus of claim 3, wherein at least one of the one or more slave devices is a scanner capable of being worn on a user's finger,
and/ or wherein preferably the scanner is capable of transmitting bar code information to the second transceiver,
and/ or wherein preferably at least one of the one or more slave devices is a printer,
and/ or wherein preferably at least one of the one or more slave devices is a personal data managing device.

5. The apparatus of claim 1 or 2, wherein the period between activating the first radio transceiver and deactivating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals.

6. The apparatus of claim 5, wherein the first time period and the second time period are of equal intervals.

7. Apparatus for transmission coordination, comprising:
a first radio transceiver operating in accordance with a first communication protocol and using a frequency band,
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band, wherein the first radio transceiver and the second radio transceiver are mounted together in a housing;
a coordinator associated with the housing, for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

8. The apparatus of claim 7, wherein the frequency band is about 2.4 GHz,
and/ or wherein preferably the first communication protocol is the IEEE 802.11 protocol,
and/ or wherein preferably the second communication protocol is the Bluetooth protocol.

9. The apparatus of claim 7 or 8, wherein the period between activating the first radio transceiver and deactivating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals,
and/ or wherein preferably the first time period and the second time period are of equal intervals.

10. Apparatus for transmission coordination, comprising:
a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz and having a first antenna system;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz and having a second antenna system;
wherein the first antenna system and the second antenna system are of orthogonal polarization.

11. Apparatus for transmission coordination, comprising:
a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz;

a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the Bluetooth protocol transmission transmits at power level of about 0 dBm.

12. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the IEEE 802.11 protocol transceiver uses one of the two or more sub-bands and the Bluetooth protocol transceiver uses another of the two or more sub-bands.

13. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;
a base station operating in accordance with the IEEE 802.11 protocol;
a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the second radio transceiver is equipped with a look-ahead function for determining whether the two or more sub-bands are being used by the first radio transceiver that will also be used by the second transceiver.

14. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with a first communication protocol and using a frequency band;
a base station operating in accordance with the first communication protocol;
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;
a coordinator associated with the first radio transceiver for deactivating the second radio transceiver while the first radio transceiver is in use.

15. A method for operating a portable data communications device using first and second wireless data communications protocol comprising:

operating said data communications device in a power saving mode of said first communication protocol, whereby said device has active time periods for transmitting and receiving data communications signals using said first communications protocol and dormant time periods during which said device neither transmits nor receives data communications signals using said first protocol;
operating said data communications device as a master device according to said second communications protocol whereby said data communication device controls operation of slave devices communicating therewith; and
controlling said operation according to said second data communications protocol to operate only during said dormant time periods.

16. A method as specified in claim 15 wherein said controlling comprises providing a signal indicating that said active time period will commence following a predetermined time interval and terminating operation according to said second data communication protocol during said predetermined time interval,

and/ or wherein preferably said first wireless data communications protocol is the IEEE 802.11 protocol,

and/ or wherein preferably said second wireless communication protocol is Bluetooth.

17. A method for operating a wireless data communications system having an access point and at least one mobile unit associated with said access point using a first wireless protocol, wherein said mobile unit is arranged to conduct wireless data communications with other units using a second wireless protocol, comprising:

transmitting periodic beacon signals from said access point according to said first wireless protocol;
transmitting global clear to send signals from said access point according to said first wireless protocol, said global clear to send signals preventing mobile units from transmitting signals using said first data communications protocol during an allocated time interval within said beacon signal period;

controlling said access point to avoid transmissions during said allocated time interval;
operating said mobile unit in response to said global clear to send signal to conduct wireless communications acting as a master unit using said second wireless protocol during said allocated time interval.

18. A method as specified in claim 17 wherein said first wireless data communications protocol is the IEEE 802.11 protocol,
and/ or wherein preferably said second wireless communication protocol is Bluetooth,
and/ or wherein preferably said beacon signal period is divided into three time intervals, and wherein said access point conducts power saving mode data communications during a first time interval, wherein said allocated time interval is a second time interval and wherein said access point conducts data communications using said first wireless protocol during a third time interval,
and/ or wherein preferably said first time interval is immediately following said beacon signal,
and/ or wherein preferably said first wireless data communications protocol is the IEEE 802.11 protocol
and/ or wherein preferably. said second wireless communication protocol is Bluetooth.

19. A method of operating a data communications system using a master-slave protocol, wherein a master transceiver transmits to slave units during first even time slots and wherein slave units transmit to said master unit during odd time slots, and wherein said transmissions follow a predetermined frequency hop pattern at a hop rate corresponding to said time slots, comprising:

operating said master unit during a first time period of each time slot to detect interfering signals at a frequency corresponding to the following time slot, and
inhibiting transmission by said master transceiver during even time slots if interfering signals have been detected during either of the current or previous time slots.

20. A method according to claim 36, wherein said operating step comprises tuning said master unit to receive signals corresponding to the frequency allocated to the next following time slot; detecting the strength of signals received and retuning said master unit to send or receive signals corresponding to the frequency allocated to the current time slot,
and/ or wherein preferably said protocol is Bluetooth.

21. A method for providing voice communications in a wireless data communications system having a mobile unit arranged to communicate with an access point using a first data communications protocol and arranged to communicate with other devices using a second data communications protocol, comprising:

communicating data corresponding to said voice communication between said access point and said mobile unit using said first data communications protocol;
communicating said data corresponding to said voice communications between said mobile unit and a portable device using said second data communication protocol, said communication being arranged at time intervals which avoid interference with said communicating using said first data communications protocol; and
converting voice signals to data corresponding to said voice signals and converting data signals corresponding to voice signal into voice signals in said portable device.

22. A method as specified in claim 21 wherein said data corresponding to voice signals comprises compressed voice signal data,
and/ or wherein preferably said first communications protocol is the IEEE 802.11 protocol,
and/ or wherein preferably said second communication protocol is Bluetooth,
and/ or wherein preferably said communication between said mobile unit and said portable device uses a Bluetooth ACL link,
and/ or wherein preferably said data corresponding to voice signals comprises compressed voice signal data.

23. A method for operating a mobile unit arranged to communicate using first and second data communication protocols operating in the same frequency band wherein said mobile unit associates with an access point and receives therefrom beacon signals demarcating time intervals according to said first communications protocol, comprising:

receiving signals from said access point designating a portion of one of said time intervals during which mobile units associated with said access point refrain from transmissions using said first data communications protocol, and
operating said mobile unit as a master unit using said second data communications protocol to communicate with slave units during said designated portion of said time interval.

24. A method as specified in claim 45 wherein said first protocol is the IEEE 802.11 protocol,

and/ or wherein preferably said signals comprise CTS signals,

and/ or wherein preferably said second protocol is Bluetooth.

25. A method for operating a wireless data communications network having at least one access point and at least one mobile unit, including a mobile unit arranged to communicate with said access point using a first wireless data communication protocol in a first frequency band and to communicate with other devices using a second wireless data communication protocol in said first frequency band, comprising:

transmitting signals from said access point in said first communications protocol, said signals designating a time period wherein mobile units associated with said access point refrain from transmitting using said first data communications protocol; and

operating said mobile units as a master unit to conduct wireless data communications with said other devices operating as slave units using said second data communications protocol during said designated time period.

26. A method as specified in claim 25 wherein said first communications protocol is the IEEE 802.11 protocol,

and/ or wherein preferably said signals comprise CTS signals.

27. A method for operating a mobile unit arranged to communicate using first and second data communications protocols operating in the same frequency band, wherein said mobile unit associates with an access point, comprising:

receiving in said mobile unit first and second control signals using said first data communications protocol;

operating said mobile unit in response to said first control signals to act as a master unit and conduct data communications with slave units using said second data communications protocol; and

discontinuing communications by said mobile unit using said second data communications protocol in response to said second control signal.

28. A method as specified in claim 27 wherein said first protocol is the IEEE 802.11 protocol,

and/ or wherein preferably said signals comprise CTS signals.

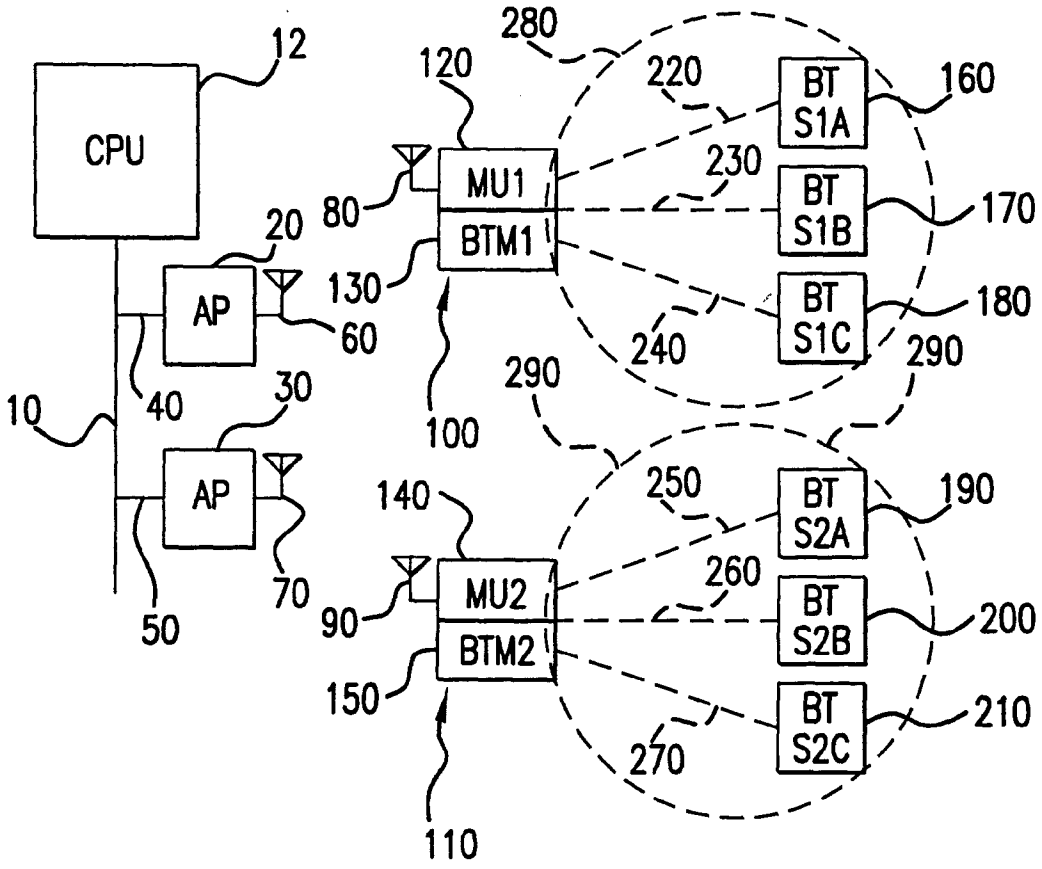

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AP
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60
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MU1
BTM1
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120
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MU2
BTM2
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140
150
110
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230
240
250
260
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FIG.1

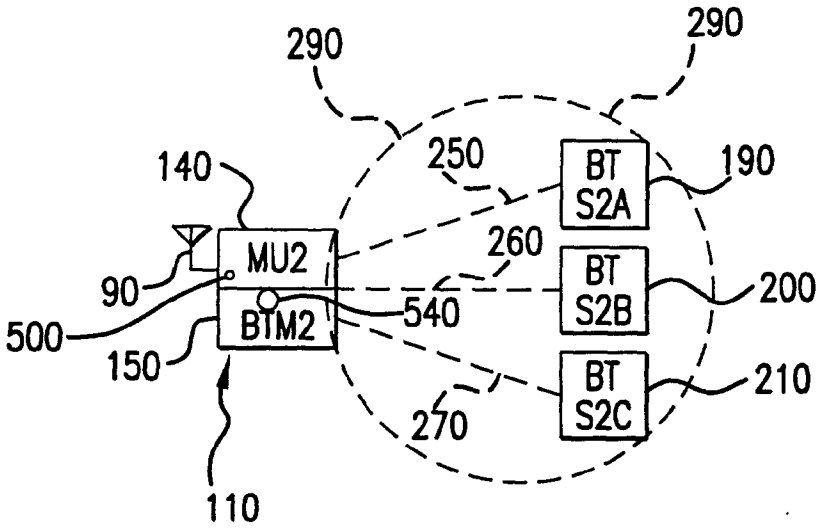

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BT S2C
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FIG.2

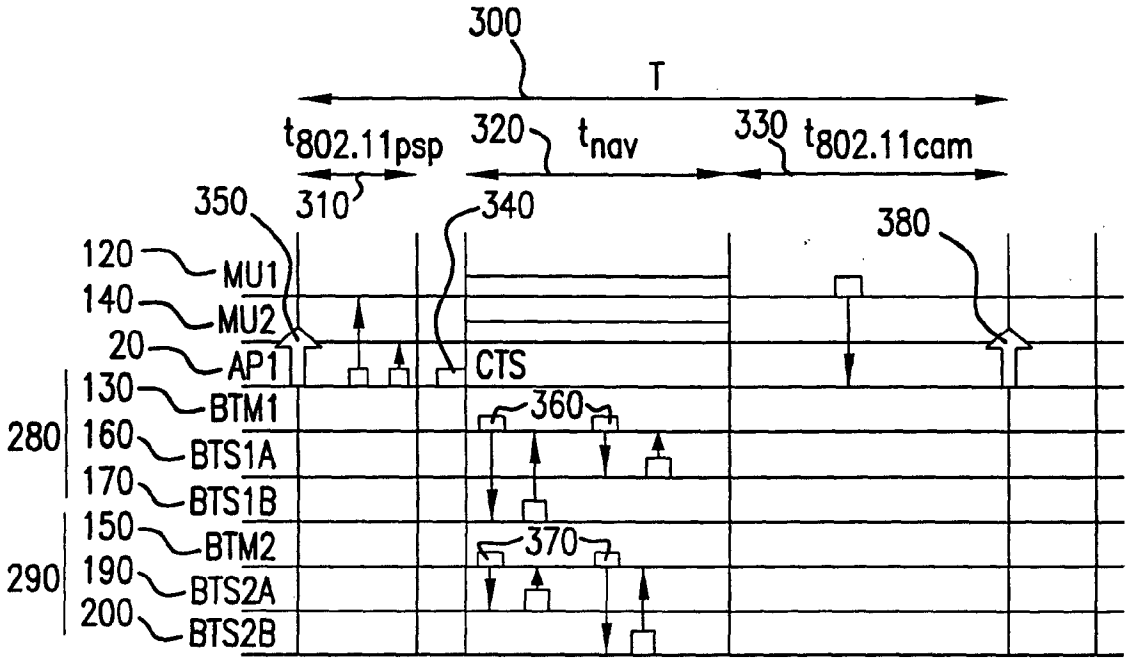

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FIG.3

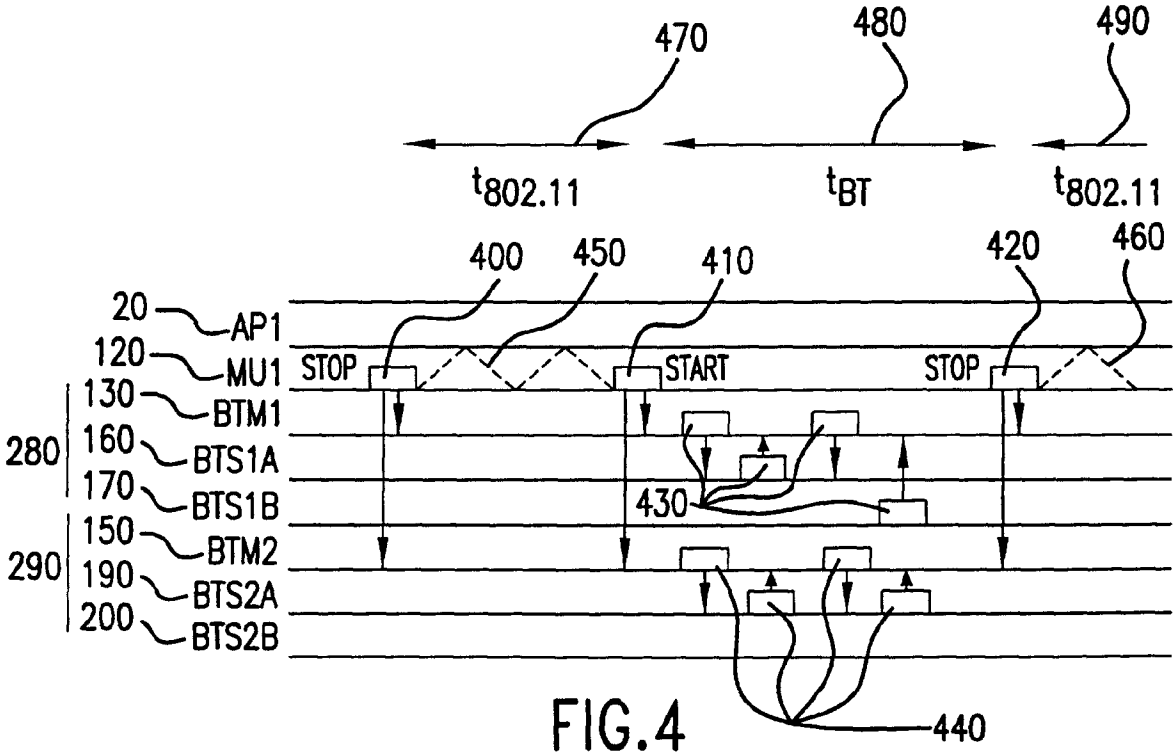

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20 AP1
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STOP
START
STOP
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160 BTS1A
170 BTS1B
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150 BTM2
290
190 BTS2A
200 BTS2B
440

FIG.4

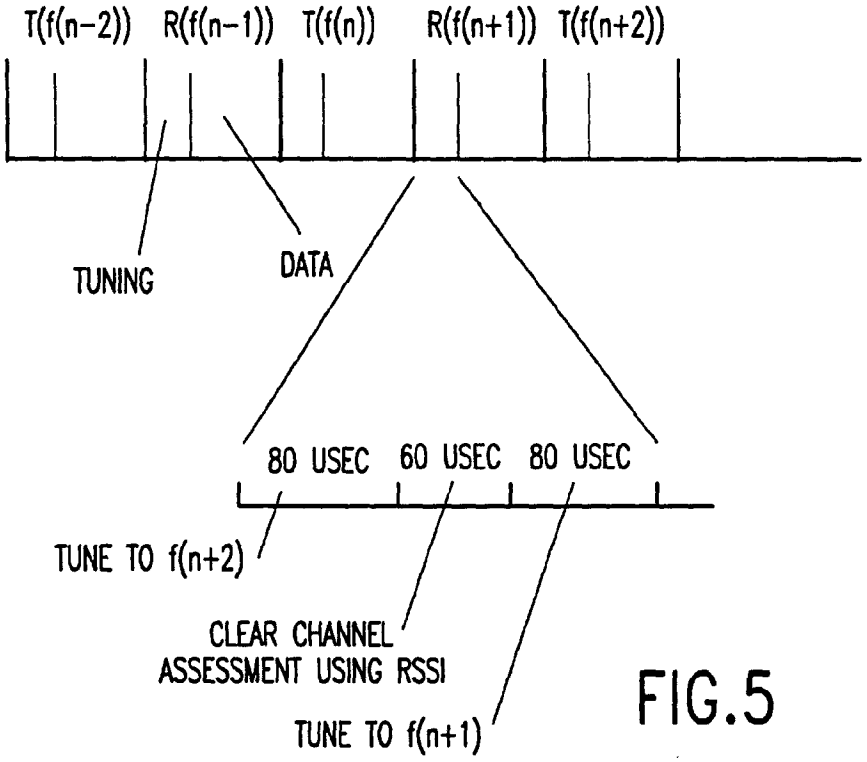

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R(f(n+1))
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TUNING
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60 USEC
80 USEC
TUNE TO f(n+2)
CLEAR CHANNEL
ASSESSMENT USING RSSI
TUNE TO f(n+1)

FIG.5

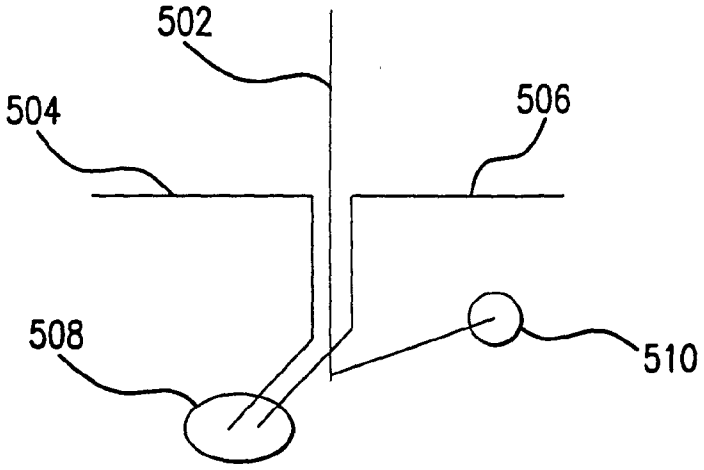

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FIG.6

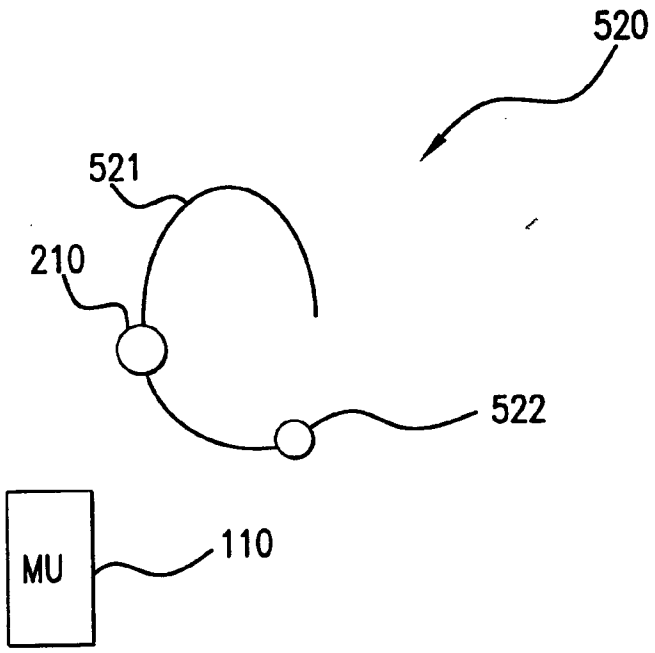

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MU
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FIG.7

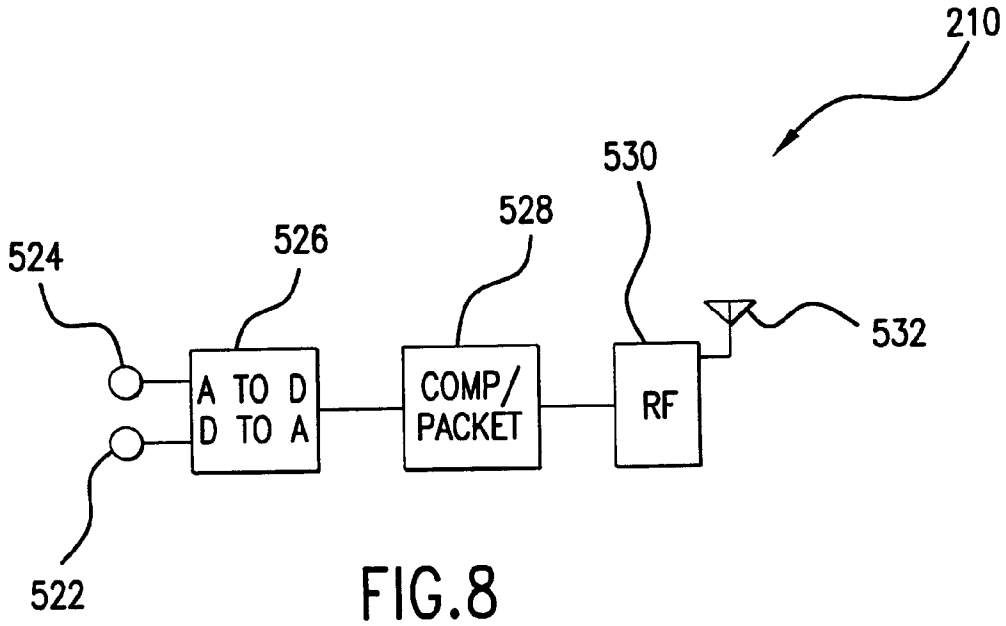

210
530
528
526
524
532
A TO D
D TO A
COMP/
PACKET
RF
522

FIG.8

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(54) Three dimensional object locator system using a sound beacon, and corresponding method

(57) An object locator system (100) generates an audio signal as if emanating from the object (118) as a user (102) varies angular orientation and distance from an object (118) or site to be located within an area. A computer (106) linked to an access transceiver (110,112) receives transmissions from a user (102) wearing a headset (104) including a transceiver (202) and electronic compass (122). The compass (122) provides a signal indicative of the user orientation. An access transceiver (110,112) receives the signal and calculates the location of the user (102) based on the time difference of arrival of the RF signal and triangulation of the user movement. An accelerometer (204) in the headset (104) continuously tracks user movement. The location of the object (118) in a vertical direction is provided by a directory or other reference source stored in the computer (106). Based on the angular orientation, horizontal and vertical distance of the object (118) or site relative to the user (103), the computer (106) maps the location information into sounds in the form of pulse amplitude or frequency modulated sound. The audio signal is perceived by the user (102) as emanating from the object (118) or site.

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Description

BACKGROUND OF INVENTION

1. Field of Invention:

[0001] This invention relates to object locator systems and methods of operation. More particularly, this invention relates to a three dimensional (3-D) object locator system for items or sites using an intuitive sound beacon: system and method of operation

2. Description of Prior Art:

[0002] There are many occasions in a user's activity to locate an item or a site. The search for the item or site often turns out to be a time consuming, expensive, in terms of lost man-hours, and frustrating problem. There are many techniques to direct a use to an item or site ranging from visual maps with directions, to using a GPS with speech. Maps are time consuming to follow and require that the user divert his/her attention as they look for an item or a site. Verbal prompts combined with GPS (such as those used in automotive applications), enable hands-and - eyes free operation but are difficult to integrate into systems used indoors and outdoors and may require additional concurrent speech input/output. One example to illustrate the problem is "warehouse picking" in which a user picks and bundles selected items gathered from within a warehouse. The picker is provided a "pick list" which includes the location, type and quantity of the item(s) to be picked. In the past, the pick list was written on paper. Current state-of-the- art warehouses are replacing paper lists with mobile terminals using either display or speech input/output to identify the item to be picked. All such modalities provide a destination location, such as an aisle and bin number, for each pick item. However, mobile terminals, for example, do not provide assistance in identifying the destination of the item, requiring the user to remember the location of the item or go back to the pick list if the destination is forgotten. What is needed in the art is an object locator system which provides continual directional feedback from an item or site to a user from any starting point within an area thereby saving time and expense in locating items or sites without irritating frustration.

[0003] Prior art related to object locator systems for items or sites, includes:

1) USP 6,097,189 issued August 1,2000 discloses a portable system that is operational for determining, with three dimensional resolution, the position of a buried object or a proximately positioned object that may move in space or air or gas. The system has a plurality of receivers for detecting the signal from a target antenna and measuring the phase thereof with respect to a reference signal. The relative permittivity and conductivity of the medium in which the object is located is used along with the measured phase signal to determine a distance between the object and each of the plurality of receivers. Knowing these distances, an iteration technique is provided for solving equations simultaneously to provide position coordinates. The system may also be used for tracking movement of an object within close range of the system by sampling and recording subsequent positions of the object. A dipole target antenna, when positioned adjacent to a buried object, may be energized using a separate transmitter which couples energy to the target antenna through the medium. The target antenna then preferably resonates at a different frequency, such as a second harmonic of the transmitter frequency.

2) USP 5,528,232 discloses a communication system that communicates for locating one or more tags in a time and energy efficient manner. The tags are positioned in a communication region and are located by a locator. The tags are located through organized transmission and reception of signals between the tags and the locator. The locator locates and gives directions to tags from the locator using a radio link and a multi-channel ultrasonic acoustic link. The combination of linkages provides the means to determine the unobstructed bearing and distance between the locator and the tag and resolves multipath reflections.

3) USP 5,798,733 discloses a position guidance apparatus is a microprocessor-based tool used to aid a parachute jumper in reaching a predetermined target position in an interactive manner. The device is particularly valuable in aiding those who have to do parachute jumps under hazardous conditions such as at night, into terrain with no visible orientation features, or into terrain wherein a precisely located landing is desired. The position guidance apparatus provides location/directional guidance in a visual and potentially audible manner to guide the user in steering he/she into an appropriate targeted landing zone. The apparatus is one that is preferably strapped onto the forearm of a user and provides a small graphical display of current position, target position, and predicted destination position. Alternatively, the display can be implemented as a heads-up display for the user. The display further relays instruction information to the user to vary the predicted destination position and thereby minimize deviation from a predetermined target position.

4) USP 5,394,332 discloses to an on-board navigation system which continuously informs a driver of the degree of approach of a vehicle to a destination by outputting a sound suited to the driver's actual running feeling.

[0004] None of the prior art discloses an object locator system for items and/or sites in which the system tracks the user relative to the item or site to be located and generates sound cues perceived by the user as originating from the item or site to be located, the sound cues changing in intensity as the user moves toward or away from the item or site to be located.

SUMMARY OF INVENTION

[0005] An object locator system generates an audio signal as if emanating from the object as a user varies angular orientation and distance from an object or site to be located within an area. The system includes a central computer linked to an access transceiver receiving RF transmission from a user wearing a headset including a transceiver and electronic compass. The compass provides a signal indicative of the user orientation which is received by access transceivers as an input to a computer for calculating the location of the user based on the time difference of arrival of the RF signal and triangulation of the user position. Optionally an accelerometer may be included in the headset to continuously track user movement. The location of the object in x, y and z coordinates is provided by a directory or other reference source stored in the computer. The position of the user and the coordinates of the object may be used to calculate the orientation and distance of the user to the object. Based on the angular orientation, horizontal and vertical distance of the object or site relative to the user, the computer maps the location information into 3-D sounds in the form of pulse amplitude or frequency modulated sound. The audio signal is perceived by the user as emanating from the object or site. The sound changes in intensity as the user proceeds along the angular orientation to the object, the sound increasing in intensity as the angular sensitivity and/or distance to object is reduced. The sound fluctuates as the user travels or faces off-axis from the desired location. The headset also includes a microphone to permit the user to request directions to an item or site within a retail area. An operator is activated by the request to provide directions to the location of the object, orally or by an audio signal. Other applications include, upon user request, an operator providing guidance or an audio signal directing the user to other mobile users or attractions in an amusement park or museum, or stores in a shopping mall.

BRIEF DESCRIPTION OF DRAWINGS

[0006] The invention will be further understood from the following description of a preferred embodiment taken in conjunction with an appended drawing, in which:

Figure 1 is a representation of an object locator system incorporating the principles of the present invention;

Figure 2 is a representation of a user headset and station in the system of Figure 1;

Figure 3 is a flow diagram of a user operating the system of Figure 1 and 2 for item location by 3-D sound; and

Figure 4 is a flow diagram of the operation of the system of Figures 1 and 2 for site location by oral communication between a user and an operator.

DESCRIPTION OF PREFERRED EMBODIMENT

[0007] In Figure 1, an object locator system 100 includes a user 102 wearing a headset 104 coupled to a computer station 106 via an air link 108 and radio access points 110 and 112. A bus 114 interconnects the computer station 106 and the access points 110 and 112. The user is in audio or voice communication via a transceiver (not shown) including microphone 116 with the computer station 106 monitored by an operator 117 at a terminal 119. The operator may provide oral instructions to the user to locate an object, for example, an item 118 in a warehouse 120 or the user 102 may be automatically directed to the object by 3-D sounds, as will be described hereinafter. A compass in the headset, represented by compass dial 122, provides orientation to the user corresponding to the direction of vision. The user position or location is determined by the radio access points 110 and 112 based on the time difference of arrival of user transmission and triangulation of the user transmissions. The computer station 106 knowing the location of the user and orientation of the user relative to the item calculates the angular direction and distance of the item from the user. The calculated orientation and distance are converted into modulated RF signals; transmitted to the user, via the access point, and converted into 3-D sound cues in the headset. The sound cues operate as a homing beacon to the item being located by the user. Although the user could be directed to the item with spoken directions, the use of modulated sound has many advantages. Words are inefficient and interfere with other verbal commands/prompts. For example, in the warehouse, a user may be asking for the quantity and weight of an item while concurrently following a background sound beacon. From a system view, words require more memory storage, and represent a discrete sample. By using modulated sound, the user can be given constant feedback as to the proper heading. The sound essentially becomes a homing beacon perceived as originating from the item being located.

[0008] Numerous methods can be applied for mapping heading information into sounds using various types of headsets or speakers. Using a monaural system, the heading can be mapped into a form of pulse amplitude or frequency modulation scheme or various hybrids. In one embodiment, if the user is oriented online with the item, the sound cues or feedback is mini-

mal. The intensity of the sound queues would be proportional to orientation or directional error.

[0009] The sound can be synthesized to reflect a three-dimensional location of the item and is varied based on the distance between the item and the user. At relatively far distances, where a small angular deviation can apply large physical distance errors, the feedback sensitivity (change in sound as a function of angle) is increased that is (a small difference in angle causes a wider fluctuation in sound). As the user nears the item, the angular sensitivity is reduced to improve precision location of the item.

[0010] Figure 2 shows further details of the system 100 of Figure 1. The headset 102 includes a transmitter receiver (transceiver) 202 coupled to the microphone 116 and the compass 122. If the compass is not provided, the user orientation can be generated by an accelerometer 204 continuously tracking the user's movement and generating a directional vector which can be substituted for the electronic compass display. The transceiver 202 is further connected to an audio amplifier or sound generator 206 linked to earphones 208 and 210. An antenna 212 attached to the headset is coupled to the transceiver which sends and receives RF transmissions to the access point 110 and 112 linked to the computer station 106. The operator 117 monitors the computer station at the terminal 119 (See Figure 1).

[0011] In the computer station 106, a user position determining unit 214 receives the user transmissions from the access points 110 and 112 and calculates the user's absolute position in terms of grid coordinates x, y and z based upon well know laser or radio triangulation principles described, for example, in USP 4,912643 issued March 27, 1990. Alternatively, the user position may be calculated at the access points in lieu of the computer station. In any case, the positioning determining unit generates a packet 216 having several fields including a user identification (Id) field 218, an X-coordinate field 220, a Y coordinate field 222 and a Z coordinate field 224. The packet 216 is provided to a processor 226 at an input terminal 228. The operator 117 enters into the processor 226 via terminal 228 an item or site identification (Is) to be located by the user. The processor outputs the Id via terminal 232 to a storage device 234 having a listing of items or sites by Id. and their x, y and z coordinates. In response to the processor input, the storage device generates a packet 236, including the Id., x, y and z coordinates for the item to be located by the user which is received at processor input terminal 228. The processor 226 subtracts the x, y and z coordinates of the packet 216 and 236 and generates an output 240 indicating the distance (D) of the user to the item and an output 242 indicating the orientation or the angle of the user to the object to be located. Sound generator 244 uses the distance and angle signals to generate pulse modulated or frequency modulated signals indicative of the location of the item to the user. The pulse modulated or frequency-modulated signals are transmitted through switch 246 and via bus 114 to the access points which transmit the modulated RF signal over air link 108 to the user. The switch 246 enables the operator 117 to turn off the modulated signals and establish voice communications with the user via voice transceiver 247.

[0012] The headset antenna 212 captures the modulated signals which are processed by the transceiver 202; provided to the sound generator 206; converted into 3D sounds and transmitted to the earphone 208 and 210 for reception by the user. If the user is online, the 3D sound is minimal. Intensity of the 3-D sound is proportional to the directional error.

[0013] In another embodiment, the system 100 can provide customers within a retail super store the location of an item. In such case, the customer communicates with the operator, via a headset or a shopping cart with a microphone while the switch 247 is in the oral communication state. The operator can obtain the customer's location on a display in the terminal and direct the customer to the item in question by oral instruction following the customer's movements on the display and knowing the location of the item in the store. In still another embodiment, an operator may direct mobile users to a location in an amusement park or a museum or a store in a shopping mall, based on the operator knowing the location of the user and item in the environment in which the user is functioning.

[0014] In Figure 3, a flow diagram describes one embodiment of the system in a process 300, as follows:

Step 302: User activates object-locating system by donning a headset and activating communication with an operator at a computer station serving the system.

Step 304: The computer station or access points connected to the computer station, calculate the location of the user in terms of x, y, z coordinates and user Id. using the time difference of arrival of the user's transmissions and radio triangulation.

Step 306: The operator instructs the user to locate an item at a site.

Step 308: The operator switches the system to automatic and the location of the item in terms of x, y and z coordinates and the user coordinates are compared in a processor to determine a distance and orientation of the user to the item.

Step 310: The distance and orientation parameters are translated into modulating signals corresponding to the distance and orientation of the user to the item in question.

Step 312: The user receives modulated RF signals

as 3D sound cues and using an electronic compass in the headset, chooses an orientation, which minimizes the sound.

Step 314: The computer station tracks the user and the 3D sound is adjusted as the user approaches the item until the point where the sound disappears when the user has "picked" the item.

[0015] In Figure 4, a flow diagram describes a process 400 for directing a Locator, i.e. a customer or a service personnel or sales person to a site, as follows:

Step 402: The user activates the object locating system by donning a headset and activating communications with an operator at a computer station serving the system.

Step 404: The computer system or access point calculates the location of the user for an Id and x, y and z coordinates.

Step 406: The operator, knowing the location of the site to be located, orally transmits instructions to orient the user towards the site to be located.

Step 408: The computer station tracks the position of the user for display at the computer station or receives oral feedback from the user as movement occurs along the orientation to the desired site.

Step 410: The user continues dialog with the operator until the site is located.

[0016] While the invention has been shown and described in conjunction with preferred embodiments, various changes can be made without departing from the spirit and scope of the invention, as to defined in the appended claims, in which

Claims

1. An object locator system comprising:

(a) a user-mounted orientation apparatus including a transceiver which electronically transmits a signal representative of the user's orientation in a 360-degree azimuth;
(b) a processor linked to access transceivers and receiving the signal;
(c) an object directory or reference source stored in the processor and providing the location of an object in a coordinate system to the processor;
(d) calculating apparatus, executing in the processor, which calculates the angular orientation and distance of the user to the object to be located; and
(e) audio apparatus responsive to the processor for generating and transmitting an audio signal based on the processor calculations, the audio signal characterized as three dimensional and perceived by the user as emanating from the object to be located.

2. The system of Claim 1 further comprising:

(f) modulating apparatus which changes the intensity of the audio signal as the user approaches the object or travels or faces off-axis from the object location,
and/or

(g) an electronic compass in the user mounted orientation apparatus for providing the signal indicative of the user orientation in the azimuth,
and/or

(h) an accelerometer in the user mounted orientation apparatus for tracking user movement and providing a signal indicative of the user position,
and/or

(i) position location apparatus in the access transceiver for calculating the user position by the time difference of arrival of the signal and triangulation; and
conversion apparatus for converting the user position into the coordinate system,
and/or

(j) an operator station for communicating with user,
and/or

(k) switching apparatus for transferring the user from the audio signal to an operator for interactive communication,
and/ or wherein the user mounted orientation apparatus preferably further comprises:

(l) a headset set an antenna for receiving the audio signal; and
a microphone enabling the user to communicate with an operator.

3. The system of Claim 1 wherein the reference source generates the location of the object in a digital packet containing an object identification and object location in three dimensional coordinates,
and/or wherein user position apparatus gen-

erates a digital packet containing a user identification and location in three-dimensional coordinates,
and/or wherein the processor recieves digital packets from the access transceivers and the references source and calculates the user position in terms of angular orientation and distance to the object to be located.

4. An object locator system generating three dimensional sounds perceived by a user as emanating from an object to be located, comprising:

(a) a portable user station transmitting a signal for location and communication purposes;

(b) a central station receiving the signal and providing the location of the portable user station relative to an object to be located as an output signal; and

(c) sound generating apparatus responsive to the output signal and providing to the user portable station the three dimensional audio signal which changes in intensity as the user portable station varies in angular orientation and distance to the object to be located.

5. The system of Claim 4 further comprising:

(d) an operator station coupled to the central station for communicating with the user portable station in lieu of the three dimensional audio signal,
and/or

(e) calculating apparatus in the central station for calculating the angular orientation and distance of the user to the object to be located,
and/or

(f) position location apparatus including access transceivers in the central station for calculating the user position by the time difference of arrival of the signal and triangulation, system.

6. A method for locating an object at an unknown location, comprising:

(a) generating an electronic signal indicative of a user's orientation in a 360-degree azimuth;

(b) transmitting the signal to a processor via access transceivers;

(c) storing in the processor a directory signal indicative of the location of the object in a coordinate system;

(d) calculating the distance and orientation of the user relative to the object to be located; and

(e) generating and transmitting via the access transceivers an audio signal to the user, the audio signal characterized as emanating from the location of the object and changing in amplitude or phase intensity as the user approaches the object or travels or faces off-orientation from the desired location.

7. The method of Claim 6 further comprising:

(f) modulating the intensity of the audio signal as the user approaches the object or travels or faces off-axis from the object location,
and/or

(g) tracking user movement and providing a signal indicative of the user position,
and/or

(i) calculating the user position by the time difference of arrival of the signal and triangulation,
and/or

(k) transferring the user from the audio signal to an operator for interactive communication,
and/or

(l) generating the location of the object in a digital packet containing an object identification and object location in three-dimensional coordinates,
and/or

(m) generating a digital packet containing a user identification and location in three-dimensional coordinates,
and/or

(n) receiving signals from the access transceivers and directory signals stored in the processor and calculating the user position in terms of angular orientation and distance to the object to be located.

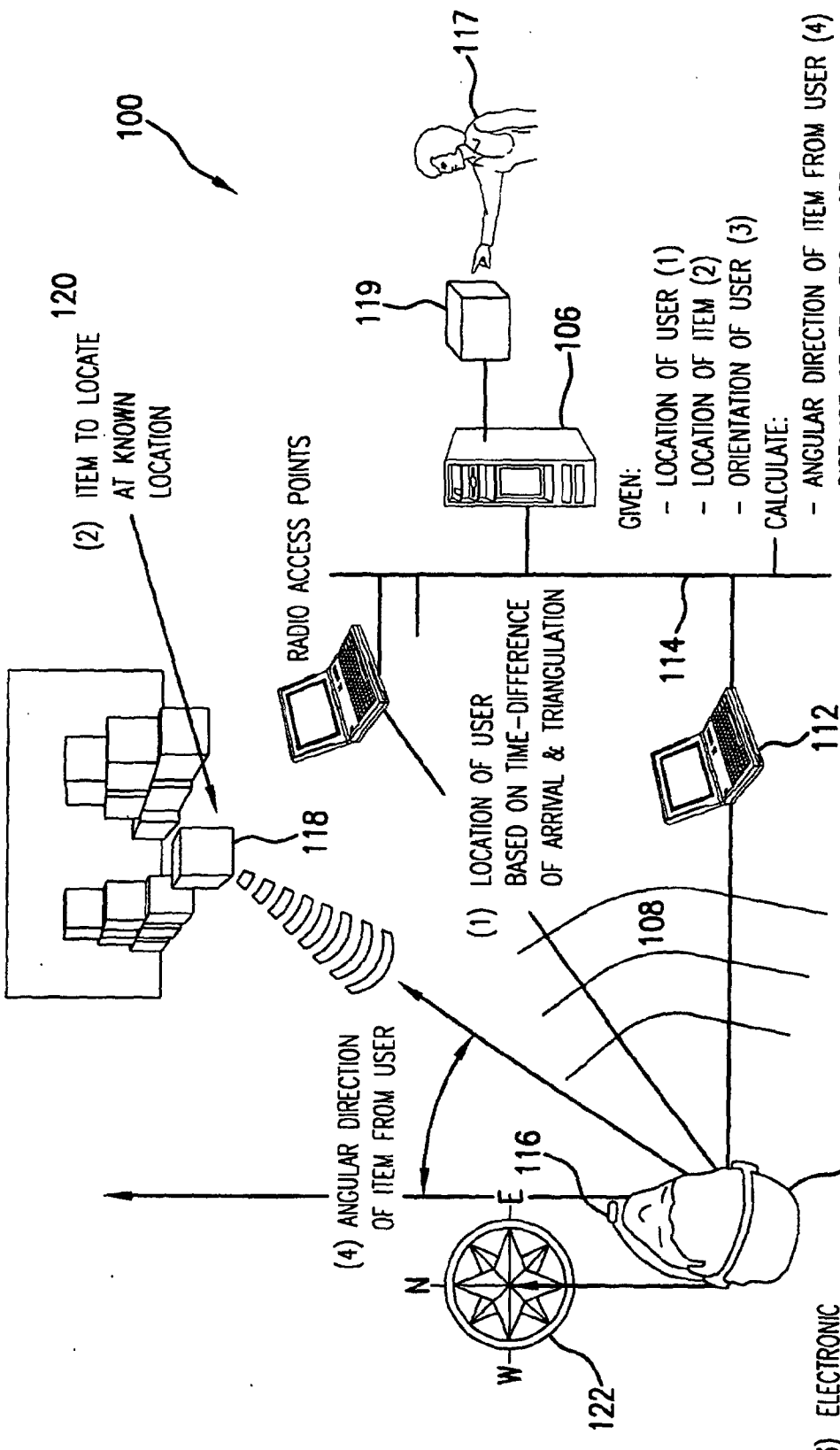

100
120
(2) ITEM TO LOCATE AT KNOWN LOCATION
117
119
106
RADIO ACCESS POINTS
GIVEN:
- LOCATION OF USER (1)
- LOCATION OF ITEM (2)
- ORIENTATION OF USER (3)
CALCULATE:
- ANGULAR DIRECTION OF ITEM FROM USER (4)
- DISTANCE OF ITEM FROM USER
GENERATE:
- 3D SOUND AS IF COMING FROM ITEM DIRECTION AND DISTANCE RELATIVE TO USER
118
(1) LOCATION OF USER BASED ON TIME-DIFFERENCE OF ARRIVAL & TRIANGULATION
114
112
108
(4) ANGULAR DIRECTION OF ITEM FROM USER
E
116
102
N
W
122
(3) ELECTRONIC COMPASS EMBEDDED WITHIN HEADSET FOR USER ORIENTATION

FIG. 1

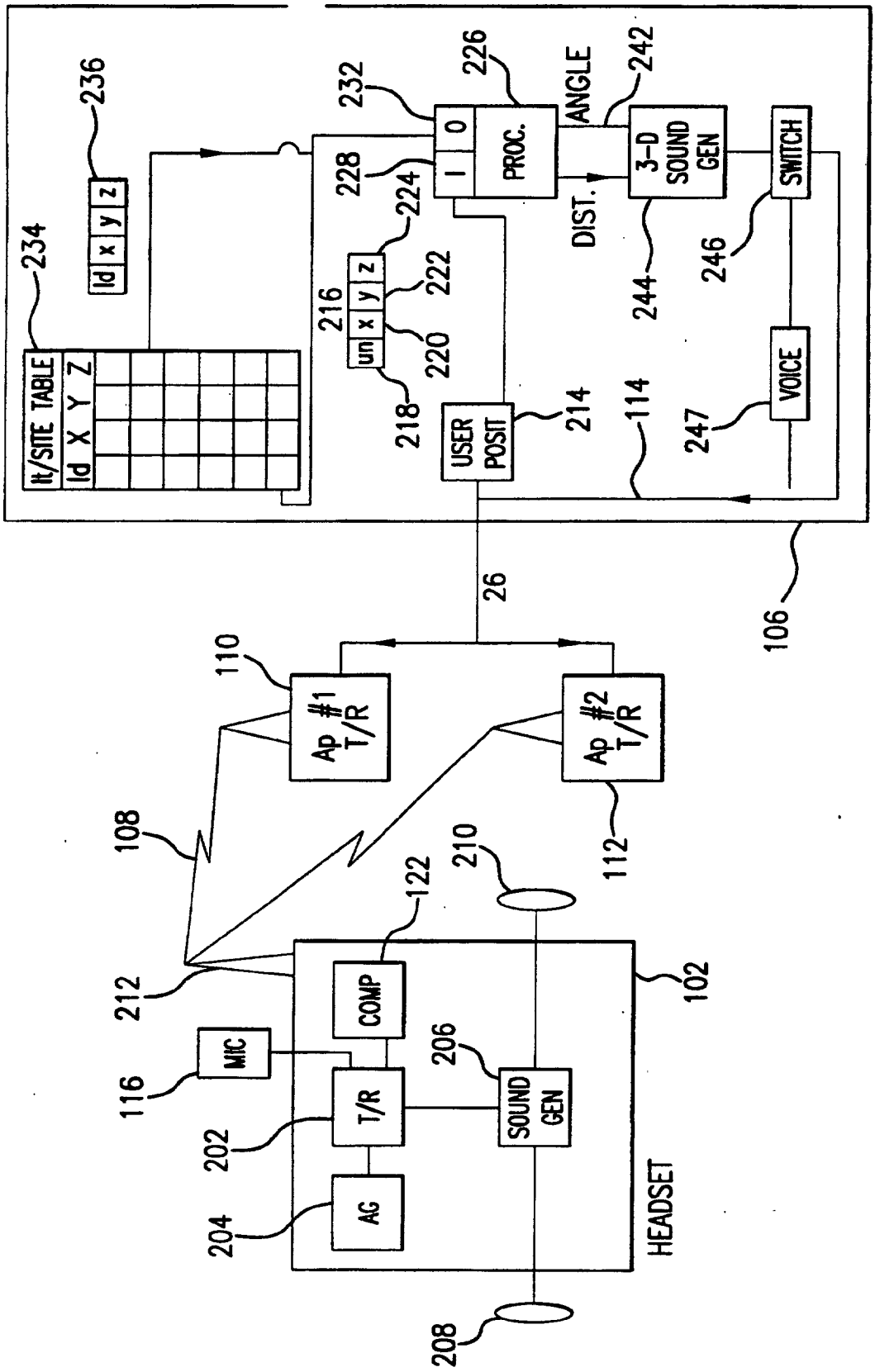

STATION
106
26
USER POSIT
214
114
218
220
222
224
216
un x y z
228
232
I
O
PROC.
226
ANGLE
242
DIST.
244
3-D SOUND GEN
246
SWITCH
247
VOICE
236
id x y z
234
lt/SITE TABLE
Id X Y Z
110
Ap #1 T/R
112
Ap #2 T/R
108
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COMP
MIC
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SOUND GEN
T/R
202
AG
204
208

FIG.2

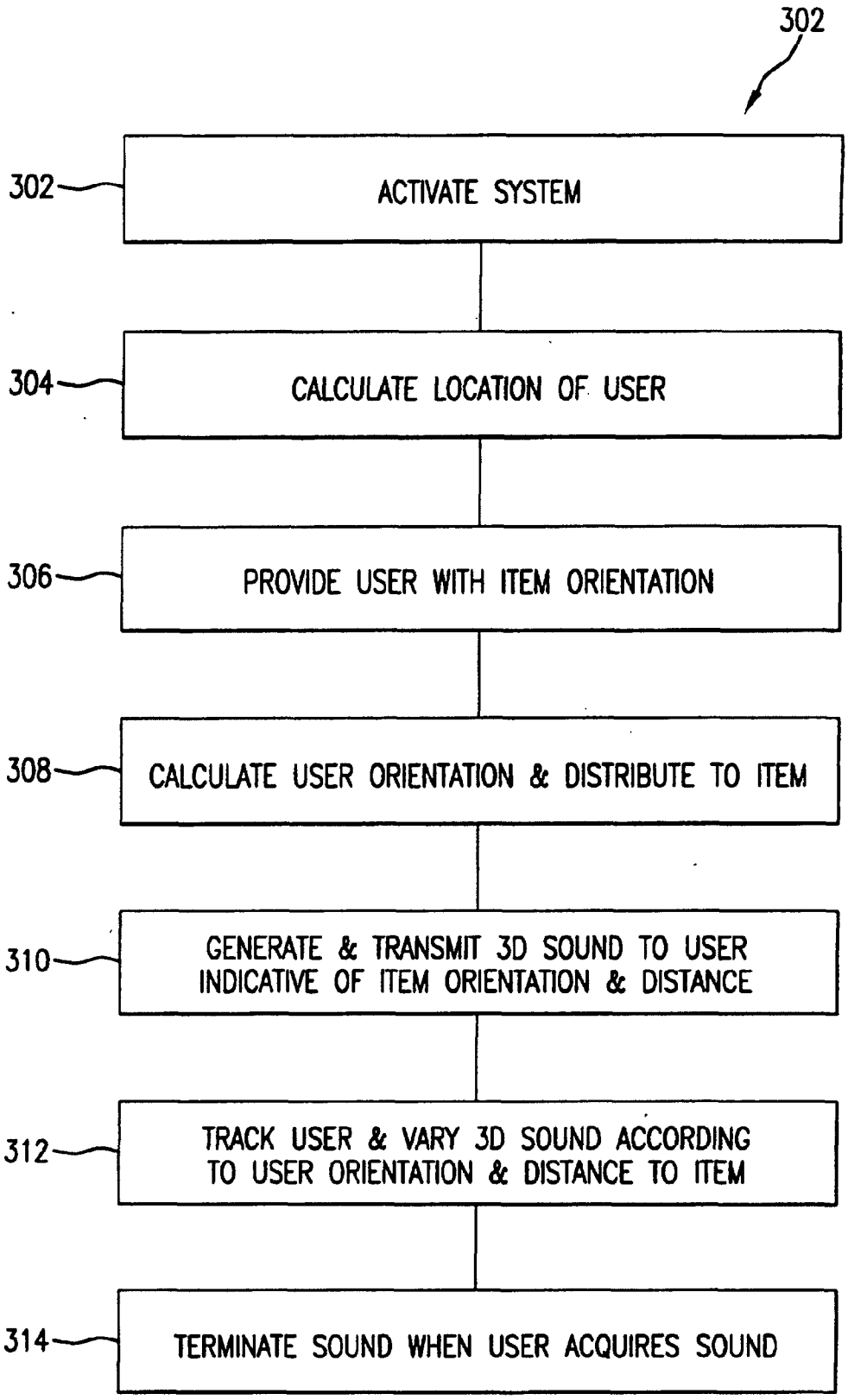

302
302
ACTIVATE SYSTEM
304
CALCULATE LOCATION OF USER
306
PROVIDE USER WITH ITEM ORIENTATION
308
CALCULATE USER ORIENTATION & DISTRIBUTE TO ITEM
310
GENERATE & TRANSMIT 3D SOUND TO USER INDICATIVE OF ITEM ORIENTATION & DISTANCE
312
TRACK USER & VARY 3D SOUND ACCORDING TO USER ORIENTATION & DISTANCE TO ITEM
314
TERMINATE SOUND WHEN USER ACQUIRES SOUND

FIG.3

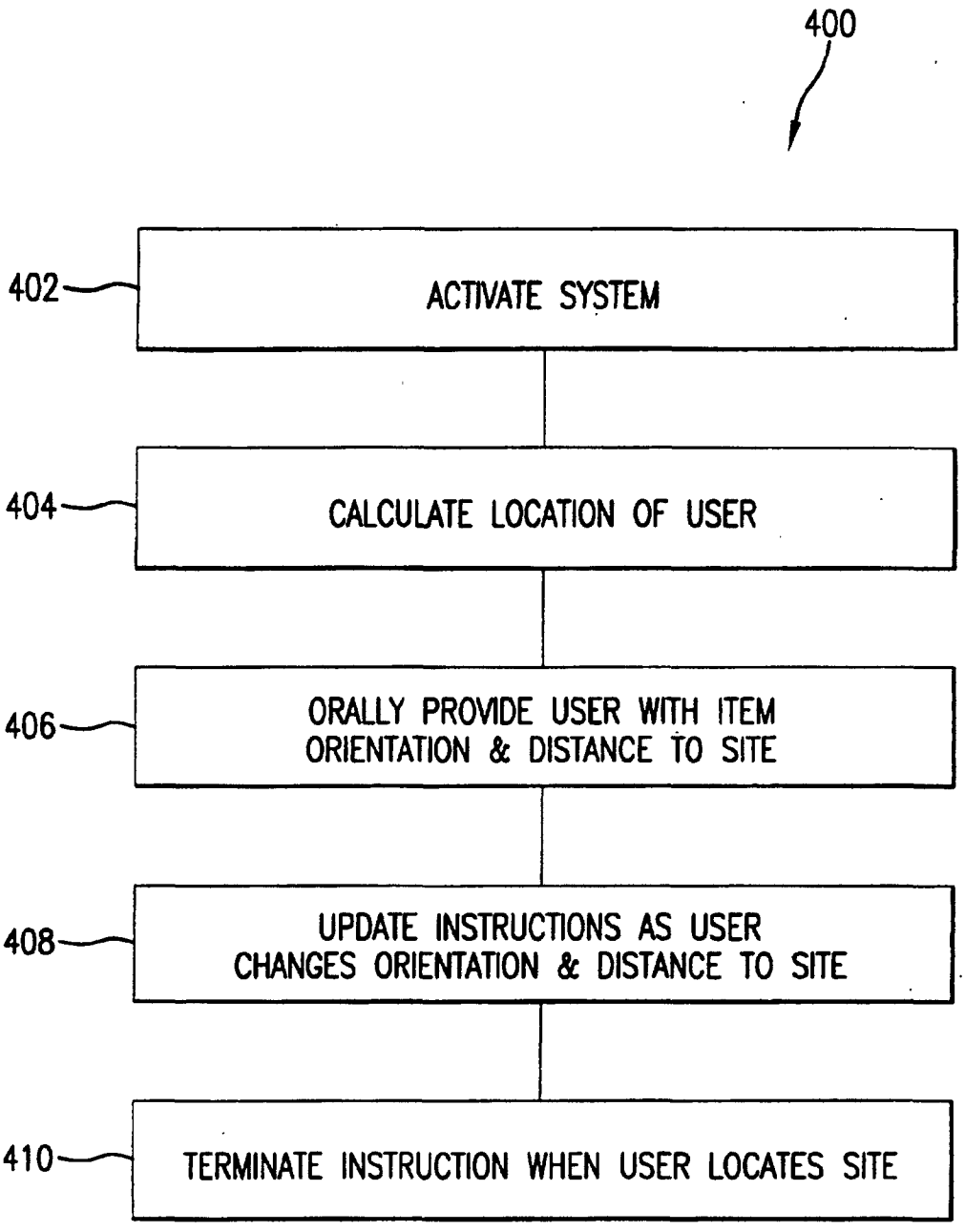

400
402
ACTIVATE SYSTEM
404
CALCULATE LOCATION OF USER
406
ORALLY PROVIDE USER WITH ITEM ORIENTATION & DISTANCE TO SITE
408
UPDATE INSTRUCTIONS AS USER CHANGES ORIENTATION & DISTANCE TO SITE
410
TERMINATE INSTRUCTION WHEN USER LOCATES SITE

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 1741

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	WO 00 62089 A (AMAN JAMES A ;HALLER WILLIAM R (US)) 19 October 2000 (2000-10-19) * page 3, line 1 - page 11, line 8; figures 1,2 *	1-7	G01S5/06 H04R5/033
D,Y	US 5 394 332 A (ARAKI MORIO ET AL) 28 February 1995 (1995-02-28) * abstract; claims 1,5 *	1-7	
A	DE 196 40 068 A (ALSTHOM CGE ALCATEL) 2 April 1998 (1998-04-02) * the whole document *	1,2,4,6, 7	
A	US 4 278 975 A (KIMURA YOSHINORI ET AL) 14 July 1981 (1981-07-14) * abstract *	1,4,6	
A	US 5 017 930 A (STOLTZ JOHN R ET AL) 21 May 1991 (1991-05-21) * abstract *	1,2,4-6	
A	GB 2 255 250 A (MARCONI GEC LTD) 28 October 1992 (1992-10-28) * abstract *	1,4,6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G01S H04R G01C G10K
D,A	US 5 528 232 A (MIHOVILOVIC DOMINGO A ET AL) 18 June 1996 (1996-06-18) * column 1, line 1 - column 8, line 8 * * figures 1,2 *	1,4,6	H04S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	29 November 2002	van Norel, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 02 1741

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-11-2002

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 0062089	A	19-10-2000	AU	4353700 A	14-11-2000
			WO	0062089 A1	19-10-2000
US 5394332	A	28-02-1995	JP	3155020 B2	09-04-2001
			JP	4289415 A	14-10-1992
			JP	4289416 A	14-10-1992
DE 19640068	A	02-04-1998	DE	19640068 A1	02-04-1998
US 4278975	A	14-07-1981	JP	1296338 C	26-12-1985
			JP	54101695 A	10-08-1979
			JP	60019470 B	16-05-1985
			CA	1117632 A1	02-02-1982
US 5017930	A	21-05-1991	AT	152248 T	15-05-1997
			AU	645551 B2	20-01-1994
			AU	7441991 A	21-08-1991
			BR	9105951 A	13-10-1992
			CA	2072121 A1	26-07-1991
			DE	69125822 D1	28-05-1997
			DE	69125822 T2	06-11-1997
			DK	512078 T3	20-10-1997
			EP	0512078 A1	11-11-1992
			ES	2102395 T3	01-08-1997
			FI	923376 A	24-07-1992
			GR	3024056 T3	31-10-1997
			HU	62094 A2	29-03-1993
			JP	2588662 B2	05-03-1997
			KR	171428 B1	01-05-1999
			NO	922930 A	15-09-1992
			RU	2100820 C1	27-12-1997
			WO	9111730 A1	08-08-1991
GB 2255250	A	28-10-1992	NONE		
US 5528232	A	18-06-1996	US	5640151 A	17-06-1997
			US	5686902 A	11-11-1997
			US	5973613 A	26-10-1999
			AT	134044 T	15-02-1996
			DE	69116946 D1	21-03-1996
			DE	69116946 T2	20-06-1996
			DK	467036 T3	11-03-1996
			EP	0467036 A2	22-01-1992
			ES	2082885 T3	01-04-1996
			GR	3019842 T3	31-08-1996
			JP	4232488 A	20-08-1992

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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(60) **Références à d'autres documents nationaux apparentés :**

(71) **Demandeur(s) :** *SYMBOL TECHNOLOGIES INC* — US.

(72) **Inventeur(s) :**

(73) **Titulaire(s) :** .

(74) **Mandataire :** RINUY SANTARELLI.

(54) PERFECTIONNEMENTS EN MATIERE DE RECHERCHE DE DONNEES.

(57) Divers problèmes sont posés par l'accès à l'Internet. Par exemple, des fichiers Internet comportent des adresses de fichiers complexes qui sont sujettes à une entrée incorrecte par un utilisateur, conduisant à l'accès à des fichiers non désirés. Selon un aspect, l'invention résout ce problème par le codage de l'adresse du fichier dans un symbole à codes à barres, par le décodage du symbole à codes à barres et par l'accès au fichier pertinent de manière automatique.

FR 2 752 347 - A1

ARRIERE-PLAN DE L'INVENTION

Domaine de l'Invention

L'invention se rapporte aux perfectionnements en matière de recherche de données.

Description de la Technique Apparentée

Divers lecteurs et systèmes de scannage optique ont été développés pour lire des indices imprimés tels que des symboles à codes à barres apparaissant sur une étiquette ou sur la surface d'un article et fournissant des informations concernant l'article telles que le prix ou la nature de l'article. Le symbole à codes à barres lui-même est un motif codé d'indices composé, par exemple, d'une série de barres de largeur variable espacées les unes des autres pour former des espaces de largeurs diverses, les barres et les espaces ayant des caractéristiques de réflexion de la lumière différentes. Les lecteurs transforment électro-optiquement les indices graphiques en signaux électriques qui sont décodés en caractères alphanumériques qui sont censés être descriptifs de l'article ou d'une caractéristique de ce dernier. De tels caractères sont typiquement représentés sous forme numérique, et utilisés en tant qu'entrée vers un système de traitement de données pour des applications de traitement de points de vente, de contrôle d'inventaire ou analogues.

Des systèmes de scannage connus comprennent une source lumineuse pour générer un faisceau lumineux incident sur un symbole à codes à barres et un récepteur de lumière pour recevoir la lumière réfléchie et décoder l'information contenue dans le symbole à codes à barres de manière conforme. Les lecteurs peuvent comprendre un système de scannage à spot mobile dans lequel on fait parcourir le faisceau lumineux rapidement à travers le symbole à codes à barres destiné à être lu ou un champ fixe d'un système de lecture de vue dans lequel le symbole à codes à barres destiné à être lu est illuminé dans son ensemble et un réseau à CCD (semi-conducteur à couplage de charge) est fourni pour détecter la lumière réfléchie à partir du symbole à codes à barres.

Les lecteurs optiques connus pouvant être tenus dans la main sont souvent sous forme d'un pistolet ayant une partie crosse et une partie barillet. La fenêtre de lecture à travers laquelle le faisceau lumineux passe est généralement localisé à la face terminale de la partie barillet, et le lecteur est pointé vers les indices à lire par l'opérateur tenant la partie crosse. Une détente est située dans la région de jonction entre la partie crosse et la partie barillet pour la mise en oeuvre par l'utilisateur afin d'actionner le lecteur optique.

De plus, il existe des ordinateurs portables tenus dans la main connus pour collecter des données et télécharger les données vers un dispositif central ou périphérique. Les données téléchargées peuvent être des données brutes ou des données qui ont été traitées à l'intérieur de l'ordinateur tenu à la main. La collecte des données peut être réalisée en entrant les informations dans l'ordinateur tenu dans la main via un clavier à touches, ou en incorporant dans l'ordinateur un lecteur optique par exemple pour lire des symboles à codes à barres, ou en incorporant un lecteur pour lire une bande de carte magnétique. Par exemple, lorsqu'une information concernant divers produits est requise pendant l'établissement d'un inventaire, ces produits peuvent porter des symboles à codes à barres ou des bandes magnétiques, ou présenter des cartes à bande magnétique associée qui sont lues par l'ordinateur tenu dans la main. Les données collectées peuvent être transférées à partir de l'ordinateur tenu dans la main vers un dispositif central ou périphérique par des moyens connus tels que des liaisons radio à fréquence radio, des connexions câblées, des communications infrarouge ou autres agencements de transmissions connus.

Souvent, plus d'un système de saisie de données est nécessaire pour une application donnée. La fabrication d'un système personnalisé pour une application spécifique est coûteuse et difficile à modifier s'il est souhaité par la suite d'incorporer d'autres options de saisie de données que celles prévues à l'origine dans le dispositif personnalisé.

En outre, les services de distribution de messages ou de courrier

électroniques traditionnels proposés dans des environnements d'exploitation usuelle (par exemple BSD Unix, SCO Unix) ont employé un schéma de boîte à lettres simple dans lequel chaque utilisateur reçoit des messages dans une boîte à lettres ou répertoire spécifique. Chaque machine ou hôte exécute sa propre copie du service de distribution de courrier et chaque utilisateur reçoit par conséquent des messages sur une machine particulière en conséquence de quoi chaque machine est sollicitée pour assurer un stockage local et les duplications de données surviennent fréquemment. Pour atténuer ce problème, une solution proposée à l'intérieur des réseaux d'ordinateurs ayant une configuration statique a consisté à offrir des systèmes de fichiers réseau fournissant un mécanisme d'accès unifié à des espaces de stockage à travers le réseau indépendamment d'une machine particulière. Du fait que les fichiers pertinents sont retenus à un emplacement unique, ce système assure aux utilisateurs un accès unifié aux boîtes à lettres et empêche la duplication des données utilisateur sur des machines individuelles.

Avec l'avènement des dispositifs informatiques portables tenus dans la main qui communiquent avec un ordinateur central, ou hôte par communication sans fil, un problème a surgi. D'une façon générale, le dispositif communique avec un point d'accès, lequel est en communication directe avec l'hôte. Comme le dispositif est déplacé physiquement, il doit se réassocier avec des points d'accès à l'hôte lorsqu'il se déplace à l'extérieur de la zone de portée d'un point d'accès et pénètre dans la zone de portée d'un autre. Le problème est d'autant plus exacerbé lorsque le dispositif est déplacé à partir d'une zone de service de base vers une autre auquel cas un système de courrier réseau permanent ne peut être assuré ni sur le plan physique ni sur le plan logique.

Des services de distribution de courrier électronique actuellement connu comprennent au plus deux "tâches" indépendantes : agent d'utilisateur de courrier et agent de transfert de courrier. L'agent d'utilisateur de courrier fournit l'interface utilisateur vers le service et l'agent de transfert de courrier traite la réception et la mémorisation ou stockage des messages dans les boîtes à

lettres utilisateur. Les tâches s'exécutent généralement de manière indépendante, l'agent d'utilisateur de courrier ignorant l'état de l'agent de transfert de courrier ou ayant simplement accès à l'information concernant des détails des boîtes à lettres de chaque utilisateur. Comme mentionné ci-dessus, bien que le schéma soit approprié lorsque les boîtes à lettres sont placées ou montées de manière permanente dans un système de fichier et accessible par toutes les machines d'un réseau, lorsqu'un système portable sans fil tenu dans la main parcourt aléatoirement la zone locale et se déplace d'une zone de service de base (système de fichier) à une autre zone de service de base, le schéma ne fonctionne plus de façon fiable.

Des exemples typiques de systèmes de distribution de messagerie connus sont exposés dans, par exemple, le magazine Sunexpert d'avril 1994 dans un article intitulé "Sendmail" par Peter Collinson. Un message est entré dans l'agent d'utilisateur de courrier et traité par l'agent de transfert de courrier. Sur les réseaux étendus les diverses tâches sont réalisées par une machine concentratrice de courrier vers laquelle tout le courrier d'un réseau est envoyé pour être traité. Le système peut être amélioré par l'introduction de la possibilité d'étendre les listes de distribution, d'exécuter le courrier par des programmes et par le transfert automatique de courrier entre certains utilisateurs. Un système devient progressivement plus complexe dès qu'il passe du courrier local au courrier sur le réseau international Internet, au courrier entre réseaux.

D'autres limitations sont imposées en raison de la capacité de stockage réduite des ordinateurs tenus dans la main (souvent connus sous le nom d'assistants numériques personnels) en conséquence de quoi les systèmes de messagerie électronique simple-enregistrer-et-envoyer multi-utilisateurs sont généralement irréalistes.

Pour fonctionner sur un réseau sans fil, des unités mobiles (UM) doivent avoir un domaine afin de pouvoir s'associer avec les points d'accès (PA) dans un groupe de point d'accès (GPA). Un GPA est un groupe d'un ou plusieurs points d'accès connecté sur le même routeur sur le même réseau. Tous les

points d'accès dans le même GPA sont identifiés par le même domaine. Ceci permet au point d'accès dans un GPA de communiquer sur le réseau sans conflit avec les autres GPA sur le même réseau.

Le désavantage des protocoles d'attribution de domaine de l'art antérieur réside dans le fait que certaines UM peuvent être utilisées sur des GPA multiples, voire des réseaux multiples. L'utilisation d'une unité mobile sur des GPA multiples nécessiterait de changer le domaine de l'unité mobile pour lui permettre de communiquer via le GPA approprié au moment approprié. L'utilisation d'une unité mobile sur des réseaux multiples pourrait également nécessiter de changer le domaine, étant donné que les GPA sur le nouveau réseau pourraient être dans un domaine différent.

De plus, lorsqu'une pile TCP/IP est utilisée (protocole de commande de transmission/protocole Internet), chaque noeud du réseau doit avoir une adresse IP pour ce réseau. L'ensemble des protocoles TCP/IP recouvre typiquement les accès média, les transports de paquets, les communications de session, les transferts de fichiers, le courrier électronique, et l'émulation de terminaux. Les adresses IP pour différents réseaux ne nécessitent pas d'être uniques. Si de multiples réseaux sont connectés et si les noeuds communiquent à travers tous les réseaux, alors les noeuds requièrent des adresses IP qui soient uniques à travers le réseau étendu.

En résumé, chaque point d'accès sur un réseau doit avoir une adresse IP unique pour ce réseau. Chaque unité mobile sur un réseau, indépendamment du domaine qu'il utilise, doit avoir une adresse IP unique pour ce réseau. Les unités mobiles peuvent être utilisées sur des réseaux multiples. L'utilisation sur des réseaux multiples requiert généralement de changer l'adresse IP de l'unité mobile étant donné que l'adresse IP en cours d'utilisation par l'unité mobile pourrait être en utilisation par une autre unité mobile sur le nouveau réseau ou pourrait ne pas être conforme aux conventions d'adresse IP utilisées par le nouveau réseau.

Par conséquent, un système est requis pour attribuer des domaines et

des adresses IP à des unités mobiles pour couvrir une variété de configurations et de nombreux types différents d'unités mobiles. Plus particulièrement, un système est requis pour autoriser l'attribution de domaines et d'adresses IP à des unités mobiles de manière suffisamment souple pour supporter des installations dans lesquelles les unités mobiles sont fixées à des GPA spécifiques sur des réseaux spécifiques et dans lesquels les unités mobiles se déplacent parmi différents GPA voire parmi différents réseaux, tels que les réseaux Spectrum One et Spectrum 24 (marques déposées de la Société Symbol Technologies Inc.).

Conformément à un autre aspect, il a été précédemment proposé d'implémenter un scanneur de codes à barres résident sur une machine de commande exécutant un objet MODELE DE COMPOSANT-OBJET (COM). Il est souhaité d'augmenter le cadre de telles applications pour les rendre compatibles avec une large gamme de modèles et en particulier pour introduire un scanneur de codes à barres distant de la machine et commandé par une interface sans fil.

La demande de brevet européen en cours N° 485 996 décrit, entre autres, un système pour le remplacement de stock épuisé utilisant un système dans lequel les articles du stock de remplacement sont étiquetés avec une information à destination ultime codée avec des codes à barres, et conditionnés dans un conteneur pour embarquement vers un centre de réception/distribution.

Il est connu en général de faire usage d'un symbole à codes à barres bidimensionnel, sur l'extérieur d'un conteneur, pour indiquer ce qu'il y a à l'intérieur : voir la revue Material Handling Engineering, octobre 1992, article intitulé "New Dense Code Symbology Transports Data File".

Le réseau informatique Internet acquiert une importance toujours croissante dans le monde des sciences, de la technologie, de l'information et du commerce parmi beaucoup d'autres. L'Internet est bien connu du lecteur expérimenté dans ce domaine mais, pour résumer brièvement, comprend un

réseau d'ordinateur à étendue pratiquement mondiale et accessible à partir de tout point d'accès convenablement lié pour retrouver l'information contenue dans l'Internet. Divers sous-réseaux existent à l'intérieur de l'Internet dont l'un des plus connus est "worldwide web" ou "toile mondiale".

L'information est communément mémorisée sur l'Internet sous la forme de "pages" comprenant souvent une "page d'accueil" se rapportant à un site général et fournissant le guidage et l'accès au contenu de ce site, le contenu étant renfermé dans des "sous-pages". Un site inclus une adresse de Protocole Internet unique ou une adresse uniformisée de ressource (URL). Il peut être ainsi accédé au site à partir de n'importe quel point d'accès à l'Internet en entrant l'adresse pertinente et en affichant le site maintenu à cette adresse. L'utilisateur accède à l'Internet via un ordinateur client, par exemple un ordinateur individuel (PC) relié à l'Internet. La liaison s'effectue typiquement via un modem et une ligne téléphonique et un prestataire de service ou serveur agit comme intermédiaire, le client accédant à l'Internet via le serveur. De plus, le serveur permet à l'utilisateur d'installer un site internet. Il est à noter que le serveur comprend généralement une station fixe. Un tel agencement peut conduire à un niveau de rigidité non nécessaire. En particulier, il est souvent coûteux en temps et inutilement complexe d'avoir à accéder à la station serveur fixe pour installer ou accéder à un site Internet.

Divers développements à des systèmes en rapport avec l'Internet ont été décrits dans des brevets des Etats-Unis d'Amérique. Par exemple le brevet US N° 5 550 984 se rapporte à un système de sécurité pour connecter des réseaux d'ordinateur, le brevet US N° 5 544 162 se rapporte à un pont pour connecter des processeurs parallèles à l'environnement externe, le brevet US N° 5 517 494 se rapporte à un protocole de routage pour des messages à diffusion partielle à travers l'Internet, le brevet US N° 5 416 842 se rapporte à une transmission de message entre des serveurs coupe-feu, le brevet US N° 5 410 754 se rapporte à une interface entre une porteuse de ligne câblée et un hôte distant sur un Réseau Local d'Entreprise (RLE), le brevet US N° 5 400 335 se

rapporte à un terminal de connexion Réseau Numérique à Intégration de Services (RNIS) - RLE, le brevet US N° 5 353 283 se rapporte à une transmission de paquets à travers une série de modes dans un réseau, le brevet US N° 5 351 237 concerne un réseau de RLE connecté à un RNIS comportant une pluralité de routeurs/sous-routeurs. Le brevet US N° 5 309 437 se rapporte à un dispositif du type pont pour coupler des segments d'un RLE étendu, le brevet US N° 5 289 468 se rapporte à un adaptateur de terminal pour connecter un RLE et un réseau à grande distance (WAN) utilisant un protocole standard Internet, le brevet US N° 5 276 789 se rapporte à l'affichage graphique d'une topologie de réseau d'ordinateurs, le brevet US N° 5 229 988 se rapporte à un système pour classifier des réponses d'adresse source en double, le brevet US N° 5 185 860 se rapporte à un système pour déterminer les nœuds connectés à un réseau d'ordinateurs et le brevet US N° 5 166 931 se rapporte à un système destiné à un inter-réseau agencé pour simplifier le système d'adressage du réseau. Le brevet US N° 5 442 633 se rapporte à un procédé pour router un paquet de données entre un hôte mobile et un hôte destinataire via une liaison sans fil entre l'hôte mobile et la station de base. La station de base agit comme une position physique de l'hôte mobile et est reliée au réseau via un sous-réseau RLE.

Le mécanisme de traduction des noms de fichier à travers un réseau distribué est connu, par exemple, à partir du brevet US N° 5 483 652, incorporé ici à titre de référence.

Une gamme de produits a été développée par la Société Spyglass Inc. améliorant la connectabilité Internet des dispositifs existants. En particulier, ces produits ont été conçus pour connecter des produits électroniques à la toile mondiale tels que des téléphones cellulaires, des périphériques à connecter sur des téléviseurs câblés, des organiseurs électroniques personnels et des messagers dits pageurs , fournissant l'infrastructure, les applications et les services pour doter ces dispositifs de la capacité de navigation à travers l'Internet. Un produit de ce type est disponible sous la marque commerciale

REMOTE MOSAIC, lequel convertit la navigation en une opération de service clients dans laquelle des "visionneuses" de faible poids sont intégrées sur commande dans des dispositifs qui établissent la connexion à un "navigateur de proximité" sur un serveur distant. Le navigateur de proximité manipule les applications demandant des capacités de processus ou mémoire excessive telles que le caching ou technique d'antémémoire et connecte le dispositif à d'autres serveurs.

Selon un autre aspect, il existe de nombreuses situations dans lesquelles une image instantanée d'une scène ou d'un objet est d'une utilisation et d'une importance considérables, par exemple dans la documentation de déclaration de sinistre dans laquelle il est vital de documenter aussi précisément et complètement que possible les circonstances contre lesquelles la réclamation de dommages-intérêts est effectuée. D'ordinaire, les détails sont documentés soit par écrit soit en prenant des photographies en utilisant un appareil de prise de vues. Cette information est alors entrée subséquemment avec toutes les autres informations concernant la déclaration de sinistre. Un tel système consomme du temps et est sujet aux erreurs, en particulier en raison de la re-entrée subséquente des informations et le transfert des photographies physiques vers le fichier pertinent. Des problèmes similaires se présentent, par exemple, dans la couverture par la presse d'un accident, dans les rapports d'accident de la police ou d'autres autorités, etc.

Le brevet US N° 5 583 994 se rapporte à un système réseau de délivrance d'information multimédia. Un transmetteur à grande distance transmet les programmes multimédia qui sont reçus par une pluralité de serveurs réseau pour la retransmission vers des serveurs réseau en aval ou vers un utilisateur. Les programmes sont traités à part (en antémémoire) sur les serveurs réseau comme déterminé par un programmateur pour une distribution efficace du programme multimédia vers chaque utilisateur.

Selon un autre aspect, les terminaux de données connectés à l'Internet sont de façon usuelle soumis à l'obligation de télécharger des "applets"

(composants programmatiques) dans un langage d'implémentation d'agent approprié à partir d'un hôte, ce qui constitue un processus complexe et lent.

Il existe plusieurs types différents de lecteurs de codes à barres. Un premier type, un wand (lecteur) 8, contient un émetteur 10 et un détecteur 12, et l'utilisateur déplace manuellement le wand à travers le codes à barres. Le détecteur 12 détecte la lumière réfléchie à partir d'un point lumineux balayé par le wand 8 à travers le code à barres 2, et produit un signal électrique représentant l'information codée vers un dispositif processeur 14. Les wands ont été décrits, par exemple dans les brevets US N° 4 654 482, 4 907 264 et 4 937 853.

Un document particulièrement pertinent est le brevet US N° 4 471 218 qui décrit un wand (lecteur) de données et un puits de données, et est incorporé ici à titre de référence. Selon la description un terminal d'entrée de données du type wand est entièrement autonome et sans cordon, et comporte un circuit de lecture et de mémorisation. Le terminal permet de plus de télécharger l'interface en utilisant un lien à couplage optique. De préférence, les données mémorisées sont sorties en utilisant un faisceau pulsé à partir d'une source lumineuse à faisceau de lecture. Le faisceau de sortie est détecté par un détecteur optique et décodé de façon appropriée.

Les descriptifs des références mentionnées ci-dessus sont incorporés ici à titre de référence. Les caractéristiques générales de construction et de fonctionnement d'un lecteur du type wand seront évidents pour le lecteur expérimenté dans le domaine.

Selon un autre système décrit dans la demande de brevet des Etats-Unis d'Amérique N° 08/691 263 déposée le 2 août 1996, un terminal de lecture optique qui tient dans la main est proposé dans une conception ergonomique. Selon ce système, il est proposé, entre autres, un lecteur optique qui tient dans la main agencé pour s'adapter à la main de l'utilisateur et comportant un composant lecteur et un composant de téléchargement. Le dispositif peut inclure un écran d'affichage et un écran d'affichage pour afficher des messages

de commande ou des images vidéo, un pavé de touches pour entrer des données de commande ou autres et une liaison de communication sans fil pour télécharger des données lues par le composant lecteur vers un dispositif externe. Le système peut de plus inclure une pluralité de modules de collecte de données interchangeables pouvant être connectées au corps principal du dispositif, chaque module remplissant une fonction différente telle que la capture d'image/vidéo, la capture audio, etc. Il en résulte qu'un module multimédia simple est proposé.

Il est souhaité, cependant, d'arriver à un lecteur de données qui tient dans la main de faible poids ayant une gamme encore plus grande de possibilités.

Eu égard à la simplicité, la disponibilité et l'adaptabilité relatives des systèmes d'information présentant la capacité de mémorisation de données de symboles de codes à barres, il est souhaitable de développer des systèmes particulièrement appropriés aux applications destinées au consommateur. Un lecteur optique du type wand qui offre de nombreuses applications consommateur est représenté sur la figure 21. Le dispositif, désigné d'une manière générale par la référence numérique 680 comprend un corps principal 681 en forme de stylet comportant à son extrémité d'écriture un élément de scanneur optique émetteur et détecteur de lumière 682 pour lire un symbole à codes à barres comme illustré schématiquement en 683. Le stylet peut également présenter une réelle capacité d'écriture, par exemple en ayant la plume d'écriture au voisinage de l'élément optique 682 ou, en fait, ayant l'élément d'écriture et l'élément optique 682 à des extrémités opposées. Il est souhaité d'augmenter la gamme d'applications pour un tel produit. Les capacités de traitement de données d'un tel système 680 sont limitées par ses dimensions physiques et son potentiel d'alimentation électrique qui restreignent en conséquence la gamme des applications du dispositif. De plus, divers problèmes se posent dans l'exploitation effective d'un tel système, en particulier dans la régulation des vitesses variables auxquelles les consommateurs

scannent un symbole à codes à barres donné 683.

Des terminaux de données portables usuels comprennent un dispositif d'affichage de données, des moyens d'entrée de données tels qu'un clavier et des moyens de mémorisation et de traitement de données. Une large gamme d'applications est maintenant disponible sur de tels terminaux à savoir traitement de texte, tableur, application de base de données et autres. Une part importante du travail de développement dans les terminaux de données portables connus est centrée sur l'augmentation des capacités de mémorisation et de traitement de données. Ceci a conduit à des augmentations en terme de coût et de taille/poids (et le besoin correspondant de miniaturiser par la suite les composants) conjointement à une complexité accrue aboutissant à un potentiel plus grand de défaillances ou pannes.

Selon un autre aspect, le brevet des Etats-Unis d'Amérique N° US 5 410 326 se rapporte à un dispositif de commande distant programmable destiné à interagir avec une pluralité de dispositifs commandés à distance. Le dispositif de commande distant est configuré de manière à commander une variété de dispositifs et porte des pictogrammes représentant les différentes fonctions à sélectionner par l'utilisateur. Le dispositif est de plus configuré pour recevoir et afficher des messages publicitaires, et remplir diverses autres fonctions telles que la messagerie électronique et la livraison de repas à domicile. Le système est, cependant, complexe et encombrant et d'adaptabilité limitée.

Le brevet US N° 5 521 370 se rapporte à un terminal d'acquisition de données portable qui tient dans la main destiné par exemple à l'entreposage, qui peut être monté sur une base de terminal pour la communication de données avec un ordinateur hôte et/ou le recharge des batteries. La description a trait à une interface de données entre le terminal et la base de terminal comprenant des patins de contact électrique en position de butée. Le terminal est agencé de manière à ne communiquer avec la base de terminal que lorsqu'il est amarré à cette dernière. Le terminal renferme un processeur et un système à mémoire servant de contrôleur de communication et peut être

agencé pour agir comme contrôleur de réseau une fois amarré. Une difficulté avec un tel système réside dans le fait qu'une capacité considérable de traitement et de mémorisation est incluse dans le terminal qui tient dans la main et que les données ne sont téléchargées que lorsque le terminal est amarré dans la base de terminal.

Le brevet US N° 5 280 621 se rapporte à un système de commande pour un ordinateur individuel. Dans les ordinateurs individuels usuels, un processeur de commande du système fournissait une interface entre le processeur hôte et les périphériques telles qu'un clavier de saisie. La performance du système était limitée en raison de la faible vitesse de communication entre le processeur de commande du système et le clavier, et était de plus dégradé lorsque le processeur de commande du système gérait d'autres charges de commande additionnelles telles que la gestion de l'alimentation batterie, la gestion de l'extension du bus externe et autres. Selon le brevet US N° 5 280 621, il est proposé d'introduire des microcontrôleurs pour assurer la communication entre les organes périphériques respectifs et le processeur de commande du système, libérant le processeur de commande du système des autres tâches, améliorant ainsi la performance globale du système.

La question de la gestion de l'alimentation électrique des dispositifs portables a été abordée visuellement de diverses manières. Le brevet US N° 5 027 294 se rapporte au contrôle de la décharge de tension d'un bloc d'alimentation par batterie dans lequel l'utilisateur reçoit des avertissements à des niveaux d'épuisement différents permettant une sauvegarde de la mémoire, d'empêcher un sur-épuisement et autres. Le brevet US N° 5 504 413 décrit un système de charge de batterie comportant une entrée à réaction permettant de minimiser les niveaux de surcharge de tension, et de connecter un dispositif de recharge à un organe périphérique via un port prévu sur le rechargeur. Le brevet US N° 5 487 181 se réfère à la minimisation de l'alimentation en prévoyant un processeur principal et un processeur à

consommation électrique plus faible qui permet au processeur principal de "dormir" sauf en cas de nécessité. Le processeur à consommation réduite remplit diverses fonctions mineures permettant au processeur principal de dormir autant que possible tout en pouvant être réveillé aussitôt que nécessaire. Le brevet US N° 5 511 205 se rapporte à la gestion de l'alimentation électrique d'un ordinateur bloc-notes portable à stylet. Le système comporte plusieurs plans d'alimentation qui peuvent être contrôlés indépendamment les uns des autres et peuvent être alimentés de manière sélective pour assurer qu'une tâche particulière est exécutée avec une consommation minimale d'énergie. De plus, des CPU (unité centrale de traitement) séparées opèrent de manière synchrone les unes par rapport aux autres réduisant la quantité de temps de traitement que la CPU principale doit consacrer à la fonction de gestion de l'alimentation électrique.

RESUME DE L'INVENTION

Objets de l'Invention

Un objet de la présente invention consiste à proposer un dispositif constituant un perfectionnement supplémentaire par rapport à l'art antérieur.

Caractéristiques de la Présente Invention

Selon un aspect, il est proposé un lecteur ayant un boîtier sur la face supérieure duquel un afficheur d'informations peut être situé.

Un clavier peut être prévu sur la face supérieure du boîtier, permettant d'entrer des informations concernant l'identité de l'opérateur, le mode de fonctionnement et autres informations. Un modem acoustique peut être prévu pour envoyer et/ou télécharger les informations lues par le lecteur, et/ou un connecteur d'interface peut être prévu pour connecter le lecteur à un ordinateur central pour envoyer ou télécharger des informations, et/ou un transmetteur radio peut être prévu pour transmettre l'information vers un récepteur distant et/ou un récepteur radio peut être prévu pour recevoir l'information provenant d'un transmetteur distant. Dans tous les cas, l'information peut être transférée vers un dispositif de mémorisation centrale permettant des réductions d'espace

sur le lecteur lui-même.

Le dispositif de lecture peut être un scanneur optique à "spot mobile" ou un lecteur optique à "champ de vue".

Le lecteur peut être configuré pour être connecté avec l'Internet. En particulier, le lecteur peut être agencé pour lire et décoder un symbole à codes à barres représentant une adresse de site réseau, par exemple une URL (adresse uniformisée de ressource) du worldwide web ou toile mondiale. L'accès à de tels sites est ainsi simplifié pour l'utilisateur.

Selon l'invention, il est de plus prévu un dispositif informatique portable comprenant un corps principal et au moins un module de collecte de données/communications pouvant être connecté au corps principal, le corps principal comportant une interface pour la connexion avec le module, un processeur pour traiter l'information reçue à partir du module et une liaison de communication pour échanger des informations avec un hôte. En raison de l'agencement modulaire, le dispositif peut être aisément adapté à des applications différentes sans qu'il soit nécessaire de fabriquer des systèmes personnalisés à prix élevé ou de modifier de tels systèmes ce qui s'avérerait onéreux et complexe.

Le corps principal peut comporter un afficheur visuel, par exemple un écran à cristaux liquides ou LCD. Le corps principal peut également comprendre un clavier. Les modules peuvent comprendre un module de capture d'image, un module scanneur à laser et/ou un module multimédia. Le module comporte de préférence des sous-systèmes de traitement de signaux numériques qui peuvent être d'une conception unique et programmable selon le cas. Les modules peuvent comprendre des pré-processeurs pour pré-traiter l'information avant son transfert au corps principal afin de réduire la charge exercée sur le processeur situé dans le corps principal. Le module peut être monté de manière amovible sur ou par rapport au corps principal, et en particulier par rapport à l'écran situé sur le corps principal - par exemple il peut être articulé pivotant ou monté tournant.

Le dispositif peut être configuré pour une connexion à l'Internet.

Selon l'invention, il est de plus prévu un système de distribution de messagerie électronique comprenant une partie serveur et une partie cliente, la partie cliente comprenant au moins un terminal d'interface utilisateur dans lequel la partie cliente est agencée à la réception d'une requête par un utilisateur spécifique, pour interroger la partie serveur à propos des messages mémorisés par la partie utilisateur adressée à l'utilisateur spécifique. Le système convient ainsi même pour une utilisation dans des systèmes dans lesquels la partie cliente est déplacée physiquement entre des zones de service de base.

La partie cliente et la partie serveur peuvent communiquer par une communication sans fil. La partie cliente peut comprendre un ou plus d'un dispositif informatique portable.

La partie cliente peut être agencée pour recevoir des messages entrée par un utilisateur spécifique et pour communiquer ces messages à la partie serveur pour une mémorisation à la partie serveur.

La partie cliente peut être agencée pour reproduire un message et pour déterminer si le message est un message visuel ou un message audio et pour reproduire le message en conséquence. Le système peut faire partie intégrante de l'Internet ou être configuré pour être connecté à ce dernier.

De préférence, la partie serveur et la partie cliente sont prévues sur un réseau local agencé pour communiquer avec d'autres réseaux locaux comportant une partie serveur et une partie cliente via une communication serveur-serveur, le système de distribution de messagerie étant réparti entre les réseaux locaux.

Selon l'invention, il est de plus prévu un procédé d'exploitation d'un système de distribution de messagerie électronique comportant une partie serveur et une partie cliente, la partie cliente et la partie serveur étant en communication, dans lequel un utilisateur entre une requête vers la partie cliente, la partie cliente interroge la partie serveur, la partie serveur transmet à

la partie cliente tous messages mémorisés dans la partie serveur spécifique à l'utilisateur et la partie cliente reproduit les message.

L'utilisateur peut entrer un message vers la partie cliente à fin de mémorisation par la partie serveur, la partie cliente peut communiquer le message à la partie serveur et la partie serveur peut mémoriser le message.

La partie cliente peut afficher les options de l'utilisateur à fin de sélection par l'utilisateur, à savoir les options de mémorisation d'un message, de recherche d'un message, de sélection du mode d'affichage des options et de sélection du mode de reproduction. Les options peuvent être recherchées à partir de la partie serveur par la partie cliente à l'initialisation de la partie cliente.

Selon l'invention, il est proposé un système de communication destiné à un scanneur de codes à barres comprenant un hôte de contrôle, un objet de contrôle de scannage opérant dans ce dernier et un client distant associé avec le scanneur de codes à barres dans lequel l'objet de contrôle de scannage communique avec le client distant pour contrôler le scanneur de codes à barres et l'objet de contrôle de scannage est implanté sous la forme d'un contrôle OLE (liaison et imbrication d'objets). En conséquence, il est proposé un système capable d'établir une communication "sans couture" entre le contrôle de scannage et le client distant.

L'hôte et le contrôle objet de scannage peuvent communiquer et s'intégrer via des interfaces. L'objet de contrôle de scannage peut créer des unités séparées d'exécution pour contrôler la communication avec le client distant. Les unités d'exécution séparées peuvent comprendre des commandes de transaction de scanneur de codes à barres envoyer, recevoir et synchroniser.

L'objet de contrôle de scannage peut être configuré pour communiquer avec le client distant à une liaison Internet ou Intranet et/ou une communication sans fil.

Selon l'invention, il est de plus proposé :

1. Un procédé de lecture d'un symbole à codes à barres à haute densité

contenant des informations comprenant des données et une information d'interprétation des données, comprenant les étapes de réception d'un signal représentatif de l'information contenue dans le symbole à codes à barres, l'identification des données et de l'information d'interprétation des données, de traitement de l'information d'interprétation des données et d'interprétation des données selon l'information d'interprétation traitée.

2. Un procédé tel que défini en 1 dans lequel l'information d'interprétation des données comprend un script de programme, dans lequel le procédé comprend les étapes de traitement du script programmé pour créer une interface afin d'interpréter les données.

3. Un système de recherche d'informations comprenant un symbole à codes à barres à haute densité et un lecteur de symbole à codes à barres, dans lequel le symbole à codes à barres contient des informations comprenant des données et une information d'interprétation des données et le lecteur comporte des moyens pour lire le symbole à codes à barres, des moyens pour identifier l'information d'interprétation des données, des moyens pour traiter l'information d'interprétation des données et des moyens pour interpréter les données selon l'information d'interprétation traitée.

4. Un système de communication destiné à un scanneur de codes à barres comprenant un hôte de contrôle, un objet de contrôle de scannage opérant dans ce dernier et un client distant associé avec le scanneur de codes à barres dans lequel l'objet de contrôle de scannage communique avec le client distant pour contrôler le scanneur de codes à barres et le contrôle objet de scannage est implanté sous la forme d'un contrôle OLE (liaison et imbrication d'objets).

5. Un système tel que défini en 4 dans lequel l'hôte et le contrôle objet de scannage communiquent et s'intègrent via des interfaces.

6. Un système tel que défini en 4 dans lequel l'objet de contrôle de scannage crée des unités d'exécution séparées pour contrôler la communication avec le client distant.

7. Un système tel que défini en 6 dans lequel les unités d'exécution séparées comprennent des commandes de transaction de scanneur de codes à barres envoyer, recevoir et synchroniser.

8. Un système tel que défini en 4 dans lequel l'objet de contrôle de scannage est configuré pour communiquer avec le client distant par une liaison Internet ou Intranet et/ou par une communication sans fil.

Selon la présente invention, il est proposé un terminal de données pouvant être connecté à distance au réseau Internet, comprenant une entrée de données et un serveur interne pour créer un site Internet représentant les données entrées et ayant une adresse de Protocole Internet, le terminal comprenant de plus une liaison réseau coopérant avec le serveur pour permettre l'accès au site par des utilisateurs situés autre part sur l'Internet. Le système offre ainsi des bénéfices substantiels en ce qui concerne la vitesse, l'efficacité et l'accessibilité.

Le site Internet peut être un site web (présentation hypertextuelle de réseau multimédia). L'entrée de données peut comprendre un ou plus d'un moyen parmi le groupe des moyens d'enregistrement d'images, d'enregistrement du son, ou d'enregistrement de textes. La liaison réseau peut être une liaison réseau sans fil comprenant une liaison parmi le groupe de liaisons à fréquence radio, une liaison infrarouge à la norme IRDA ou une liaison par faisceau hertzien sur un réseau local d'entreprise sans fil privé, ou un réseau de téléphone cellulaire.

Selon la présente invention, il est proposé un terminal de données pouvant être connecté à un réseau de données, et distant de ce dernier, lequel comprend une entrée de données, des moyens pour créer un site de données accessible par l'utilisateur représentant les données entrées et ayant une adresse de site et une liaison réseau agencée pour recevoir des requêtes d'accès à partir des utilisateurs situés autre part sur le réseau adressé au site, et pour assurer l'accès au site adressé.

Le réseau peut comprendre un réseau du groupe de l'Internet, un

Intranet ou un Réseau Local d'Entreprise (RLE), par exemple, le réseau comprenant l'Internet et l'adresse de site comprenant une adresse de Protocole Internet. Le site peut consister en un site Web.

L'entrée de données peut comprendre un moyen parmi le groupe de moyens d'enregistrement d'images, d'enregistrement du son ou d'enregistrement de textes ou même un "renifleur" chimique qui détecte la présence de certaines matières chimiques dans l'air (par exemple du gaz naturel, ou d'autres émanations combustibles ou dangereuses). La création du site de données et les moyens d'accès peuvent comprendre un serveur interne vers le terminal. La liaison réseau peut être une liaison sans fil comprenant une liaison choisie dans le groupe comprenant une liaison à fréquence radio, une liaison infrarouge à la norme IRDA et une liaison par faisceau hertzien.

Selon l'invention, il est proposé une unité d'enregistrement d'images mobile pouvant être connectée à l'Internet via une liaison sans fil comprenant un moyen d'enregistrement d'images, un serveur pour créer un site Internet ayant une adresse de protocole Internet et représentant l'image enregistrée et une liaison sans fil configurée pour assurer l'accès au site à des requêtes dirigées vers l'adresse du site.

Le serveur peut créer des sous-pages respectives pour des images enregistrées respectives et comprendre un menu spécifiant les sous-pages sur une page d'accueil à l'adresse du site.

Selon l'invention, il est proposé un système de création de site Internet et d'accès à ce dernier comprenant une unité mobile comportant un serveur configuré pour enregistrer des images à un emplacement géographique donné et créer un site représentant l'image interne au terminal, dans lequel l'unité mobile communique avec l'Internet via une liaison sans fil et les utilisateurs accèdent au site à l'unité mobile via l'Internet.

Selon l'invention, il est proposé un procédé de création d'un site web dans lequel une unité mobile enregistre des données concernant son environnement immédiat, un serveur à l'intérieur de l'unité mobile crée une

page de site web représentant les données et ayant une adresse de Protocole Internet, et les utilisateurs de l'Internet accèdent au site web à l'adresse de Protocole Internet via une liaison sans fil entre l'unité mobile et l'Internet.

Selon l'invention, il est proposé un système de capture et de relais d'images comprenant un dispositif de capture d'images fixes distant comportant un codeur pour coder l'image capturée sous la forme d'un signal de données d'images et un transmetteur pour transmettre le signal de données d'images, le système comprenant de plus une station de base pour recevoir le signal de données d'images et fournir l'accès aux données d'images. En conséquence, un accès rapide à l'image est autorisé à la station de base.

Le dispositif de capture d'images peut comprendre une caméra numérique et peut de plus inclure un lecteur de codes à barres et/ou un microphone et/ou un dispositif d'entrée de données utilisateur et/ou inclure une imprimante, de préférence configurée pour imprimer des symboles à codes à barres ou une version sortie papier de l'image capturée.

Le dispositif de capture d'images peut comprendre un écran d'affichage visuel et, avantageusement des moyens pour altérer une image affichée sur l'écran d'affichage visuel.

L'invention se rapporte de plus à, dans ses formes préférées :

9. Un système comprenant de plus une capacité système de positionnement globale.

10. Un système dans lequel le dispositif de capture d'image comporte une partie corps et une partie poignée faisant saillie de la partie corps.

11. Un système tel que défini en 10 dans lequel un déclencheur est prévu associé à la partie poignée et agencé pour activer la capture d'image.

12. Un système tel que défini en 10 dans lequel un contrôle variable est prévu associé à la partie poignée pour contrôler le zoom ou agrandissement d'images.

13. Un système tel que défini en 12 dans lequel le contrôle variable comprend une molette.

14. Un système dans lequel le dispositif de capture d'image comprend de plus des moyens de détection de danger pour localisation dans une zone à risques.

15. Un système tel que défini en 14 dans lequel le moyen de détection de danger comprend un détecteur choisi dans le groupe d'un détecteur de fumée, un détecteur de chaleur, un détecteur d'émanation, un détecteur de mouvement.

16. Un système tel que défini en 14 dans lequel sur détection d'un danger, une image de la zone à risques est capturée et transmise à l'autorité de contrôle de danger compétente pour examen.

17. Un système dans lequel le signal de données d'images est transmis le long d'une route de transmission à coût optimisé.

18. Un système tel que défini en 17 dans lequel la route de communication est déterminée en choisissant les liaisons de communication les moins onéreuses.

19. Un réseau de données comportant un premier point de transmission, un second point de réception, une pluralité de points de transfert intermédiaire, une liaison de communications ayant un facteur de coût associé reliant des paires respectives de points, dans lequel la transmission est routée à partir du premier point vers le second point via un ou plus d'un point de transfert choisi pour minimiser le coût des liaisons de communication associées.

20. Un terminal de données comprenant un lecteur pour lire des indices visibles par machine, dans lequel le lecteur est agencé pour lire des indices codant des instructions exécutables par machine et un processeur de données agencé pour décoder et exécuter les instructions.

21. Un terminal tel que défini en 20 pouvant être connecté à un réseau informatique via une interface réseau.

22. Un terminal tel que défini en 20 dans lequel les indices lisibles par machine comprennent un symbole à codes à barres.

23. Un terminal tel que défini en 20 dans lequel les instructions lisibles

par machine sont exprimées dans un langage d'implémentation d'agent.

24. Un terminal tel que défini en 20 dans lequel le terminal comporte un boîtier de terminal et une interface Internet, le processeur de données et le lecteur sont prévus à l'intérieur du boîtier de terminal.

25. Un terminal de données tel que défini en 20 dans lequel le lecteur est connecté au terminal via une liaison physique.

26. Un terminal tel que défini en 25 dans lequel le lecteur comprend un lecteur choisi dans le groupe d'un scanneur optique à "spot mobile" ou un lecteur optique à "champ de vue".

27. Un terminal tel que défini en 20 dans lequel le terminal comprend un terminal distant agencé pour être connecté à un réseau informatique via une liaison sans fil.

Selon l'invention, il est de plus proposé un dispositif de capture d'image fixe comprenant une caméra numérique, un codeur pour coder l'image fixe sous la forme d'un signal de données d'image, et un transmetteur pour transmettre le signal de données d'image par une transmission sans fil vers une station de base distante.

Selon l'invention, il est de plus proposé une méthode de capture et de retransmission d'une image comprenant les étapes de capture de l'image en utilisant un dispositif de capture d'image distant, de codage de l'image capturée sous la forme d'un signal de données d'image et de transmission du signal de données d'image, le codeur et le transmetteur étant prévus dans le dispositif de capture d'image distant, et de réception du signal de données d'image transmis dans une station de base pour distribuer l'image. L'image capturée peut se rapporter à un incident donné et la station de base peut transférer l'image reçue vers une base de données d'assurances concernant l'incident.

L'image capturée peut se rapporter à l'état de marchandises avant livraison et l'image reçue peut être transférée de la station de base vers un point de livraison pour comparaison avec les marchandises reçues.

L'image capturée peut se rapporter à l'état de marchandises à livrer, le

signal de données d'image peut être codé sous la forme d'un symbole à codes à barres appliqué aux marchandises à livrer, et le symbole à codes à barres peut être décodé au point de livraison pour comparaison de l'image capturée avec l'état des marchandises telles que reçues.

Selon l'invention, il est proposé un système de recherche d'information produits destiné à être utilisé conjointement avec le réseau informatique Internet, dans lequel l'information produit concernant un produit choisi est accessible à un site Internet ayant une adresse de site de Protocole Internet, dans lequel l'adresse du site est directement ou indirectement représentée par des indices imprimés lisibles par machine, et dans lequel un lecteur qui tient dans la main est prévu pour lire les indices, mémoriser l'adresse du site représentée par ces derniers et télécharger l'adresse du site vers un processeur client pour accéder à l'information produit à l'adresse du site. Le produit peut comprendre un produit commercial. Le produit commercial peut être affiché sur des imprimés, les indices lisibles par machine étant imprimés conjointement à ces derniers. En variante, le produit commercial peut être affiché dans un centre de ventes au détail et les indices lisibles par machine peuvent être imprimés sur le produit ou l'emballage du produit.

Les indices imprimés lisibles par machine peuvent comprendre un symbole à codes à barres. Le lecteur qui tient dans la main peut comprendre un lecteur de codes à barres, par exemple un lecteur optique à champ de vue, tel qu'un lecteur optique du type "wand".

Le symbole à codes à barres peut être imprimé dans l'un des formats du groupe comprenant les formats UPC (code produit universel), EAN (numérotation d'articles européenne).

Les données dans le symbole à codes à barres peuvent représenter une adresse de site, ou être simplement un code de produit qui peut être utilisé pour consulter une adresse de site correspondante dans une table, et l'adresse de site peut être convertie en une URL (adresse uniformisée de ressource) à l'emplacement du processeur client.

Selon l'invention, il est de plus prévu un lecteur optique qui tient dans la main du type "wand" comprenant des moyens de lecture pour lire un indice imprimé et des moyens de mémorisation de données pour mémoriser les données représentées par l'indice imprimé, agencé pour lire l'indice imprimé associé à un produit choisi, le lecteur comportant de plus un port de chargement pour télécharger les données mémorisées vers un processeur client afin de rechercher des données additionnelles concernant le produit.

Sous ces formes préférées, l'invention comprend de plus :

28. Un lecteur comprenant un lecteur de codes à barres.

29. Un lecteur dans lequel le lecteur télécharge les données mémorisées vers un point d'accès vers le processeur client.

30. Un lecteur dans lequel les données représentées par l'indice imprimé se rapporte à un produit choisi et les données restituées comprennent des informations additionnelles concernant le produit.

31. Un lecteur dans lequel le point d'accès comprend une interface vers un ordinateur individuel.

32. Un lecteur comme défini en 31 dans lequel le point d'accès comprend un port de téléchargement dédié.

33. Un lecteur dans lequel les données mémorisées sont transférées via une interface mémoire tactile.

34. Un lecteur dans lequel l'information d'identification est transférée via une interface optique via une liaison à la norme IRDA.

35. Un lecteur dans lequel le moyen de mémorisation du lecteur mémorise des données concernant l'utilisateur du lecteur, et l'information concernant l'utilisateur du lecteur est transférée avec les données mémorisées vers un processeur client.

36. Un lecteur dans lequel l'indice imprimé accompagne une représentation d'un produit commercial.

Le processeur client peut être relié au réseau informatique Internet et les indices imprimés peuvent contenir une adresse de site au Protocole Internet

correspondant à un site contenant des informations additionnelles se rapportant au produit. De ce fait, le système ne nécessite rien d'autre que des protocoles d'adresse standard. Le lecteur peut comprendre un lecteur de codes à barres.

Selon l'invention, il est de plus proposé une méthode de recherche d'information produit dans laquelle l'information produit est mémorisée à un site du réseau informatique Internet ayant une adresse de site au Protocole Internet, et l'adresse de site est représentée sous la forme d'un indice imprimé lisible par machine, comprenant les étapes consistant à lire l'indice imprimé en utilisant un lecteur qui tient dans la main, à mémoriser les données d'adresse du site représentées par l'indice dans le moyen de mémorisation monté dans le lecteur qui tient dans la main, à télécharger les données d'adresse de site à partir du lecteur qui tient dans la main vers un processeur client relié à l'Internet et à accéder au site Internet identifié par l'adresse de site.

Le produit peut être un produit commercial. L'indice imprimé peut accompagner une représentation du produit sur un formulaire imprimé ou le produit peut être affiché dans un centre de ventes au détail, l'indice étant imprimé sur le produit ou son emballage.

Selon l'invention, il est de plus proposé un système de recherche d'information produit destiné à être utilisé conjointement avec un réseau informatique clos dans lequel l'information produit concernant un produit choisi est accessible à un site du réseau ayant une adresse de site, dans lequel l'adresse de site est représentée par un indice imprimé, un lecteur qui tient dans la main est prévu pour lire l'indice, mémoriser les données d'adresse représentées par ce dernier et télécharger les données d'adresse vers un processeur client sur le réseau afin d'accéder à l'information produit à l'adresse de site. Le réseau peut comprendre un RLE (réseau local d'entreprise). Le réseau peut comprendre un système Intranet. Le processeur client peut comprendre un ordinateur de réseau.

Selon l'invention, il est de plus proposé un système de recherche

d'information produit destiné à être utilisé conjointement avec un réseau informatique, dans lequel l'information produit concernant un produit choisi est accessible à un site de réseau ayant une adresse de site, dans lequel l'adresse de site est représentée sous la forme d'un indice imprimé, un lecteur qui tient dans la main est prévu pour relire l'indice, mémoriser les données d'adresse de site représentées par ce dernier et télécharger les données d'adresse de site vers un terminal relié au réseau, dans lequel le terminal comprend des moyens d'entrée, de sortie et d'affichage de données et copie les données d'adresse de site vers un ordinateur hôte, et l'ordinateur hôte accède au site du réseau pour introduire et afficher des données sur le terminal.

Le terminal peut comprendre un ordinateur de réseau. Le réseau peut être l'Internet ou le réseau peut être un Intranet ou bien le réseau peut être un RLE (réseau local d'entreprise).

Selon l'invention, il est de plus proposé une méthode de recherche d'information produit mémorisée à un site sur un réseau informatique ayant une adresse de site, selon laquelle l'adresse de site est représentée sous la forme d'un indice imprimé, l'indice imprimé est lu par un lecteur qui tient dans la main, les données d'adresse de site représentées par ce dernier sont mémorisées dans le lecteur qui tient dans la main et chargées vers un terminal relié au réseau informatique, le terminal comprenant des moyens d'entrée, de sortie et d'affichage de données, et selon laquelle les données d'adresse de site sont envoyées depuis le terminal vers un ordinateur hôte, et l'ordinateur hôte accède au terminal et introduit dans ce dernier le site de réseau correspondant, le terminal affichant l'information produit contenue à l'adresse du site.

Le terminal de données peut ne comprendre qu'un moyen d'affichage, des moyens d'entrée/sortie de données et des moyens de transfert de données. Le réseau peut comprendre un réseau Intranet. Le réseau peut comprendre un réseau local d'entreprise.

Selon l'invention, il est de plus proposé une méthode de recherche de données comprenant la lecture d'informations d'identification mémorisées sous

la forme d'indices imprimés en utilisant un lecteur autonome, la mémorisation de l'information d'identification dans un dispositif de mémorisation de données prévu dans le lecteur, le transfert des informations d'identification mémorisées depuis le dispositif de mémorisation des données à un point d'accès vers un système de mémorisation et de recherche de données, et la recherche des données mémorisées à partir du système identifié par l'information d'identification.

Dans les modes de réalisation préférés, l'information d'identification est utilisée pour accéder à un site Internet se rapportant au produit. Dans ce cas, par exemple, un produit dans un magazine porte un symbole à codes à barres associé, le symbole à codes à barres contenant l'adresse de site au Protocole Internet à laquelle des informations supplémentaires concernant le produit peuvent être trouvées. Le site Internet peut être un site Web. L'utilisateur mémorise l'adresse du site et ensuite la télécharge vers un ordinateur individuel ou PC, ce qui permet d'appeler la page d'accueil ou sous-page du site Internet et d'accéder à des informations supplémentaires concernant le produit. De plus, comme décrit plus en détail ci-après, le produit peut être acheté ou bien l'utilisateur peut être orienté vers des produits apparentés.

En conséquence, l'information peut être mémorisée lorsque l'utilisateur n'a pas accès au système de mémorisation et de recherche de données lui-même. Les données mémorisées peuvent agir comme un rappel ou une invite à destination de l'utilisateur. Une application particulière concerne le cas dans lequel l'information d'identification se rapporte à un produit représenté sur imprimé auquel cas des détails supplémentaires peuvent être recherchés subséquemment et dans beaucoup de cas une transaction directe peut être menée à bien par interaction avec uniquement le système de mémorisation et de recherche de données.

Le lecteur autonome peut être un lecteur qui tient dans la main. L'indice imprimé peut comprendre un symbole à codes à barres et le lecteur autonome peut comprendre un lecteur de codes à barres du type wand. L'information

d'identification peut se rapporter à un produit choisi et les données restituées peuvent comprendre des informations additionnelles concernant le produit. Le point d'accès peut comprendre une interface vers un ordinateur personnel ou un port de téléchargement spécialisé. Ce dernier permet l'utilisation de l'invention même lorsque l'utilisateur n'a pas accès à un PC.

L'information d'identification peut être transférée via une interface mémoire tactile. Le système de mémorisation et de recherche de données peut être l'Internet, l'information d'identification peut comprendre une adresse de site web et les données restituées peuvent être maintenues au site web. En variante, le système de mémorisation et de recherche de données peut comprendre un réseau informatique clos tel qu'un Intranet ou un RLE (réseau local d'entreprise). Dans ce cas, l'information d'identification peut comprendre une adresse d'emplacement de base de données ou de site appropriée se conformant au protocole adopté par l'Intranet ou le RLE. Le dispositif de mémorisation de données du lecteur peut mémoriser des données concernant l'utilisateur du lecteur, et l'information concernant l'utilisateur du lecteur peut être transférée conjointement avec l'information d'identification mémorisée vers un système de mémorisation et de recherche de données. Ceci contribue à des transactions supplémentaires telles qu'un achat et permet à un profil de consommateur d'être constitué.

Selon le premier aspect, l'invention concerne un système de traitement de données comprenant un terminal portable et un support de terminal dans lequel le support comporte une interface de terminal et une capacité processeur pour traiter des données reçues depuis le terminal et le terminal comporte une interface utilisateur, une interface de support et une capacité processeur seulement suffisante pour relayer l'entrée utilisateur vers le support pour traitement et les données depuis le support vers l'interface utilisateur. Ainsi, un client "ultramince" est prévu au terminal, le support exécutant la majorité des fonctions de calcul.

Selon un autre aspect, l'invention concerne un système de traitement de

données comprenant un terminal de données autonome, des moyens d'amarrage pour amarrer le terminal et un réseau hôte, le terminal comportant une entrée utilisateur et une interface moyen d'amarrage agencée pour relayer l'entrée utilisateur vers le support et le support comporte une interface terminal et une interface hôte agencée pour relayer l'entrée utilisateur vers l'hôte, pour traitement et une méthode de retransmission de données entre un terminal portable et une station de base comprenant les étapes consistant à entrer des données vers le terminal, à relayer les données vers la station de base avec un traitement minimal et à traiter les données à la station de base. Optionnellement, par conséquent, la majorité de la puissance de traitement peut être maintenue à l'hôte, autorisant un moyen d'amarrage ou berceau léger.

Les caractéristiques préférées comprennent de plus :

37. Une méthode dans laquelle le terminal et la station de base communiquent via une communication sans fil.

38. Une méthode dans laquelle l'information entrée dans le terminal comprend une information d'inventaire.

39. Une méthode dans laquelle l'information entrée dans le terminal comprend les informations ayant trait à la vente au détail.

40. Une méthode dans laquelle l'information entrée dans le terminal comprend les informations ayant trait à des échanges de stock.

41. Une méthode comprenant de plus l'étape consistant à connecter physiquement le terminal à la station de base à des intervalles pour télécharger des données et/ou recharger les batteries.

Selon un autre aspect, l'invention propose un système de recherche d'information produit comprenant un terminal portable agencé pour recevoir des données à partir d'un ou plus d'un point de sortie de données dans une zone d'accès produit dans laquelle le terminal est agencé pour afficher une image d'un produit à atteindre en réponse à des données reçues depuis le point de sortie de données et une méthode de recherche d'informations produit dans

laquelle un terminal portable est prévu dans une zone d'accès produit et reçoit des données à partir d'un ou plus d'un point de sortie de données, et dans laquelle le terminal affiche une image du produit à atteindre en réponse à des données reçues depuis un point de sortie de données, et un terminal de données portable pour opérer dans une zone d'exploitation ayant un ou plus d'un article physique localisé à des positions prédéterminées dans la zone, dans laquelle le terminal de données comprend un récepteur et/ou transmetteur de communication et un affichage agencé pour afficher des icônes représentatives de l'article physique et/ou de sa position dans la zone d'exploitation. Ce système basé sur des icônes permet d'implémenter un système de fichier hautement convivial, efficace et exempt d'erreur humaine.

D'autres caractéristiques préférées encore comprennent :

42. Un système dans lequel le terminal reçoit des données depuis le point de sortie des données par une communication sans fil.

43. Un système dans lequel l'image du produit correspond à un produit dans le voisinage du terminal.

44. Un système dans lequel une pluralité de points de sortie de données est prévue et l'image du produit est choisie à partir de produits dans le voisinage du point de sortie des données à partir duquel le terminal reçoit des données.

45. Un système dans lequel le terminal comporte un système de positionnement et l'image produit correspond à un produit dans le voisinage de la position détectée du terminal.

46. Un système dans lequel le terminal est agencé pour afficher une carte de la zone d'accès au produit.

47. Un système dans lequel le terminal est de plus agencé pour indiquer la position du terminal sur la carte.

48. Un système dans lequel la zone d'accès au produit comprend un centre de vente au détail.

49. Un système dans lequel le terminal est agencé pour afficher une

image d'un produit mis en vente.

50. Un système dans lequel un utilisateur de terminal introduit l'information d'identification vers le système.

51. Un système dans lequel le terminal est agencé pour afficher une image d'un produit correspondant aux préférences de l'utilisateur dérivées à partir de l'information d'identification de l'utilisateur.

52. Un système dans lequel le terminal comprend de plus un ou plus d'un dispositif choisi dans le groupe d'un lecteur optique ou d'un stylet de données.

53. Un système dans lequel le terminal comprend de plus un haut-parleur audio.

54. Un système dans lequel le terminal comprend de plus un synthétiseur vocal pour relayer le produit ou d'autres informations.

55. Un système dans lequel le terminal comprend de plus une alarme de zone agencée pour se déclencher si le terminal quitte la zone d'accès au produit ou une zone définie par rapport à la zone d'accès au produit.

56. Un système de recherche d'informations produit comprenant de plus un point d'amarrage de terminal agencé pour recevoir le terminal pour charger les batteries et/ou relayer les données.

57. Un système dans lequel le terminal est agencé pour afficher une image d'un produit à relocaliser conjointement avec une information de relocalisation.

58. Un système dans lequel la zone d'accès au produit comprend une zone de stockage et un terminal est agencé pour afficher une image d'un produit à relocaliser conjointement avec une information de relocalisation.

59. Une méthode de recherche d'informations produit dans laquelle un terminal portable est prévu dans une zone d'accès au produit et reçoit des données à partir d'un ou plus d'un point de sortie de données, et dans laquelle le terminal affiche une image d'un produit à atteindre en réponse à des données reçues à partir d'un point de sortie de données.

60. Un terminal de données portable pour opérer dans une zone d'exploitation ayant un ou plus d'un article physique localisé à des positions prédéteminées dans la zone dans lequel le terminal de données comprend un récepteur de communication et un afficheur agencé pour afficher des icônes représentatives de l'article physique et/ou sa position dans la zone d'exploitation.

61. Un appareil de transfert de données comprenant un terminal de données portable et une base agencée pour recevoir le terminal, la base et le terminal comportant des moyens pour une communication mutuelle sans fil, le terminal comprenant des moyens d'entrée et d'affichage de données et une capacité de traitement frontal minimale et la base possédant une capacité de traitement d'arrière-plan pour traiter des données provenant du terminal.

62. Un appareil dans lequel le terminal comprend de plus un dispositif choisi dans le groupe d'un récepteur de diffusion radio ou d'un récepteur de télévision.

63. Un appareil dans lequel le terminal comporte de plus une partie lecteur optique, la partie lecteur optique étant connectée de manière amovible au terminal.

64. Un appareil dans lequel le terminal comporte de plus un détecteur de déplacement/orientation, et des moyens pour contrôler l'opération du terminal en fonction des déplacement/orientation détectés.

Selon un autre aspect, il est proposé un support de terminal destiné au montage d'un terminal de données portable, le support étant conçu pour une communication sans fil avec le terminal de données, dans lequel le support est agencé pour recevoir ou dériver des informations de format d'affichage pour un terminal destiné à être monté sur le support et pour configurer les données à afficher sur le terminal selon le format d'affichage.

D'autres caractéristiques préférées comprennent :

65. Un support dans lequel le support configure les données pour un affichage selon une option choisie parmi un jeu prédéterminé d'options de

format.

66. Un support agencé pour adapter les données pour l'affichage sur la base du nombre de caractères par ligne horizontale dans le format d'affichage de données.

67. Un support agencé pour mettre à l'échelle la taille d'affichage des données pour l'adapter au format d'affichage disponible.

Selon un autre aspect, il est proposé un système de communications de données comprenant un dispositif de communication de données portable et un support de dispositif agencé pour loger de façon amovible le dispositif, dans lequel le support de dispositif comporte une entrée d'information d'identification de l'utilisateur et un verrou de dispositif agencé pour libérer le dispositif sur l'entrée d'une information d'identification d'utilisateur approuvée et une méthode de contrôle de l'accès à un dispositif de communication de données portable dans laquelle le dispositif de communication de données portable est logé de manière amovible dans un support de dispositif, un utilisateur entre l'information d'identification d'utilisateur sur le support, le support libère le dispositif si l'information d'identification est approuvée et, simultanément, démarre le compteur de temps, le compteur de temps est stoppé lorsque le terminal est réintroduit dans le support et l'utilisation identifié est facturée pour la période comptabilisée entre la libération et la réintroduction du dispositif. Cet agencement est particulièrement approprié à la location dans un endroit public tel qu'un aéroport ou un dépôt de vente au détail (libre service).

D'autres caractéristiques préférées comprennent :

68. Un système dans lequel le dispositif de communication de données portable comprend un téléphone cellulaire.

69. Un système dans lequel, sur libération du dispositif, un compteur de temps est démarré, et sur réintroduction du dispositif le compteur s'arrête pour permettre de facturer l'utilisateur identifié.

70. Un système dans lequel le support est configuré pour exécuter un test d'état sur le dispositif introduit dans le support.

71. Une méthode dans laquelle le support de dispositif exécute une vérification d'état du dispositif lorsqu'il est réintroduit.

L'invention se rapporte de plus à un dispositif de communication de données comportant des moyens de communication sans fil pour communiquer avec un ou plus d'un point d'accès vers un réseau informatique local, le dispositif comprenant de plus des moyens téléphoniques cellulaires pour une communication téléphonique classique lorsque le dispositif est hors de portée des points d'accès vers le réseau informatique local, un système de pistage de transport de marchandises comprenant un dispositif de communication pour un véhicule de transport agencé pour enregistrer la réception et/ou la livraison de marchandises et comportant des moyens destinés à une communication sans fil avec un réseau de communication et des moyens pour créer un fichier de données accessible via le réseau de communication pour fournir des informations de réception/livraison, un réseau de pistage de transport de marchandises comprenant un réseau physique de point de transfert comprenant des véhicules de transport et des stations intermédiaires et un réseau de communication, dans lequel une interface vers le réseau de communication est fournie à chaque point de transfert et dans lequel le passage des marchandises est enregistrés à chaque point de transfert permettant d'accéder à l'information de transport au réseau de communication, un bloc de batteries rechargeables destiné à un dispositif alimenté électriquement agencé pour être logé dans un chargeur de batterie pour recharge, dans lequel le bloc de batteries présente des spécification de recharge prédéterminées et comporte un circuit de contrôle de rechargement pour contrôler l'opération de recharge afin de respecter les spécifications prédéterminées et un rechargeur de batteries pour recevoir et recharger un bloc de batteries rechargeables ayant des spécifications de recharge prédéterminées et sensibles au dispositif de contrôle de recharge sur le bloc de batteries afin de contrôler l'opération de recharge de sorte à respecter les spécifications de recharge prédéterminées.

D'autres caractéristiques préférées comprennent :

72. Un système dans lequel le dispositif de communication comprend une base de communication pouvant être disposée sur un véhicule et un dispositif de données portable agencé pour une communication sans fil avec la base et comportant des moyens pour accuser réception et enregistrer la livraison de marchandises.

73. Un système dans lequel l'information de réception/livraison comprend une ou plus d'une donnée du type "marchandises reçues", "marchandises livrées", "tentative de livraison de marchandises".

74. Un système dans lequel le fichier de données fournit de plus des informations de localisation du véhicule de transport courant.

75. Un système dans lequel le moyen de création de fichier de données comprend un serveur agencé pour créer un fichier réseau.

76. Un réseau dans lequel une table de routage est développée au réseau de communication pour des marchandises destinées à être pistées.

77. Un réseau dans lequel chaque interface comprend une station de base et un terminal de données portable en communication sans fil mutuelle.

78. Un bloc de batteries rechargeables dans lequel une spécification de recharge comprend la vitesse de charge.

79. Un rechargeur de batteries comprenant une pluralité de points de réception et de recharge de bloc de batteries.

L'invention propose de plus un dispositif de données agencé pour communiquer avec un réseau de communication comportant une interface de module adaptateur et un module adaptateur dans lequel le module adaptateur porte la capacité de communication en réseau et un module adaptateur pour un dispositif de données communiquant avec un réseau de communication dans lequel le module adaptateur porte la capacité de communication en réseau pour le dispositif. Il en résulte la réalisation d'un accès à des fichiers réseau transparents.

D'autres caractéristiques préférées comprennent :

80. Un dispositif dans lequel le module adaptateur comprend une carte adaptateur.

81. Un dispositif dans lequel la capacité de communication réseau comporte au moins une pile de protocoles et au moins un client du système de fichier réseau.

82. Un dispositif dans lequel la pile de protocole et le client du système de fichiers réseau s'exécutent sur un processeur dans le module adaptateur.

83. Un dispositif de communication de données portable comprenant un dispositif de saisie de données, une interface de module adaptateur et un module adaptateur, dans lequel le module adaptateur comporte un serveur interne pour créer un site Internet et des moyens de communication pour communiquer avec un point d'accès vers le réseau Internet.

84. Un terminal dans lequel le module adaptateur comprend une carte adaptateur.

85. Une carte adaptateur pour un dispositif de communication portable, la carte adaptateur comprenant une interface de dispositif, un serveur interne pour créer un fichier réseau pour des données saisies par le dispositif et une interface de réseau.

86. Un bloc d'alimentation pour coopérer avec un dispositif afin d'alimenter électriquement le dispositif, le bloc d'alimentation comprenant des piles rechargeables, un circuit de charge et un connecteur pour la connexion à une alimentation électrique pour recharger les piles.

87. Un bloc d'alimentation dans lequel le circuit de charge comprend un ou plus d'un moyen choisi dans le groupe comprenant un convecteur CA/CC (courant alternatif/courant continu), un système électronique de charge, un système de charge à gaz.

88. Un bloc d'alimentation dans lequel les piles rechargeables sont remplaçables.

89. Un adaptateur pour un système de charge de batterie comportant un bloc de batteries et un rechargeur dans lequel l'adaptateur comporte une

interface de bloc de batteries, une interface de rechargeur et un circuit de contrôle de charge.

90. Un adaptateur comportant de plus une entrée d'alimentation pour un recharge direct.

91. Un adaptateur comportant de plus un ou plus d'un indicateur pour indiquer l'état de charge.

92. Un bloc d'alimentation rechargeable destiné à un dispositif, le bloc d'alimentation étant remplaçable par une unité de rechargeur et comportant un circuit de charge et des piles d'alimentation dans lesquelles les piles d'alimentation sont remplaçables.

BREVE DESCRIPTION DES DESSINS

Les objets et avantages de la présente invention mentionnée ci-dessus peuvent être encore plus aisément compris par l'homme de l'art en se référant à la description détaillée de plusieurs modes de réalisation préférés de l'invention, considérés conjointement avec les dessins en annexe sur lesquels les éléments similaires sont désignés par des références numériques identiques au travers de plusieurs vues, et sur lesquels :

- la figure 1 est une vue en perspective d'un lecteur optique vu de dessus et de l'arrière ;

- la figure 2a montre un terminal selon la présente invention agencé pour une liaison avec le réseau Internet ;

- la figure 2b montre un diagramme synoptique du système de connexion représenté sur la figure 2a ;

- la figure 2c montre une variante de configuration selon la présente invention ;

- la figure 2d est un organigramme représentant le fonctionnement de la présente invention ;

- la figure 3a est une vue en perspective d'un terminal de données selon la présente invention ;

- la figure 3b montre une implémentation du terminal de données selon la présente invention ;

- la figure 4 est un diagramme synoptique montrant les composants du terminal de données de la figure 3a ;

- la figure 5 représente un terminal de données qui tient dans la main ;

- la figure 6 est un détail d'un terminal de données selon la présente invention comportant des capacités de marquage ou mise en valeur ;

- la figure 7 représente un terminal de données selon un autre aspect de l'invention ;

- la figure 8 montre une variante de configuration du terminal de la figure 5 ;

- la figure 9 représente un dispositif informatique portable selon un autre aspect de l'invention ;

- la figure 10 est un diagramme synoptique d'un module de capture d'images destiné au dispositif de la figure 9 ;

- la figure 11 est un diagramme synoptique d'un module multimédia destiné au dispositif de la figure 9 ;

- la figure 12 est une vue en perspective d'une variante du dispositif de la figure 9 ;

- la figure 13 est un diagramme synoptique montrant les composants d'un service de messagerie distribuée selon un autre aspect de l'invention ;

- la figure 14 est un organigramme représentant le fonctionnement d'une partie cliente du service de la figure 13 ;

- la figure 15 est un organigramme montrant le fonctionnement d'une partie serveur du service de la figure 13 ;

- la figure 16 est un diagramme synoptique d'un système de communication sans fil usuel avec un programme d'émulation de terminal installé sur des unités mobiles ;

- la figure 17 est un organigramme illustrant une action d'un point d'accès sur réception d'un paquet provenant d'une unité mobile selon l'art

antérieur ;

- la figure 18 est un diagramme synoptique d'une application de lecteur d'interface universelle selon un autre aspect de l'invention ;

- la figure 19 montre l'interface entre un contrôle de scannage et un conteneur de contrôles selon un autre aspect encore de l'invention ; et

- la figure 20 montre de multiples unités d'exécution maintenues par le contrôle de la figure 18.

- La figure 21 représente un lecteur optique du type stylet qui tient dans la main ;

- la figure 22 montre les composants principaux d'un lecteur optique du type stylet ;

- la figure 23a illustre une utilisation du lecteur optique du type stylet selon un mode de réalisation de l'invention ;

- la figure 23b illustre une utilisation du lecteur optique du type stylet selon une variante de réalisation de l'invention ;

- la figure 24a montre une version alternative du lecteur optique du type stylet ;

- la figure 24b montre de manière plus détaillée les composants principaux du lecteur optique du type stylet montré sur la figure 24a ;

- la figure 25a montre une autre variante du lecteur optique du type stylet ;

- la figure 25b montre de manière plus détaillée les composants principaux du lecteur optique du type stylet de la figure 25a ;

- la figure 25c est une vue du lecteur optique du type stylet de la figure 25a sous un angle différent ;

- la figure 26a est une vue en coupe d'une variante du lecteur optique du type stylet ;

- la figure 26b est une vue en perspective du lecteur optique du type stylet de la figure 26a ;

- la figure 27a montre une méthode de téléchargement de l'information à

partir d'un lecteur optique du type stylet selon la présente invention ;

- la figure 27b montre une variante d'une méthode de téléchargement de l'information à partir du lecteur optique du type stylet selon la présente invention ;

- la figure 28 montre un port de téléchargement dédié à partir du lecteur optique du type stylet selon la présente invention ;

- la figure 29 est une vue en coupe du port de téléchargement montré sur la figure 28 ;

- la figure 30a montre une variante de configuration d'un lecteur optique du type stylet ;

- la figure 30b montre le lecteur de la figure 30a en fonctionnement ;

- la figure 30c est une coupe transversale partielle d'un lecteur du type stylet du type représenté sur les figures 30a et 30b ;

- la figure 31 montre un terminal et un berceau ou station d'accueil selon la présente invention ;

- la figure 32a est un diagramme synoptique d'un agencement terminal/berceau ;

- la figure 32b est un diagramme schématique d'un agencement terminal/berceau ;

- la figure 33 est un diagramme schématique d'un agencement terminal "client léger"/berceau ;

- la figure 34a est une vue d'un autre mode de réalisation d'un terminal ;

- la figure 34b est une vue en plan d'une variante d'un terminal ;

- la figure 34c est une vue latérale du terminal de la figure 34b ;

- la figure 34d est une vue arrière du terminal de la figure 34b ;

- la figure 34e est une autre vue latérale du terminal de la figure 34b ;

- la figure 34f est une autre vue latérale encore du terminal de la figure 34b ;

- la figure 35 est une représentation schématique d'une utilisation possible d'un terminal selon la présente invention ;

- la figure 36 montre un premier affichage d'icône sur le terminal ;

- la figure 37 représente une variante d'affichage d'icône sur le terminal ;

- la figure 38a montre une autre variante d'affichage d'icône sur le terminal ;

- la figure 38b montre un organigramme représentant le fonctionnement du terminal ;

- la figure 39 montre un bloc de batteries et un chargeur de batterie destiné au terminal ;

- la figure 40 est un diagramme synoptique d'une configuration alternative de terminal ;

- la figure 41 est une vue schématique d'une configuration alternative de terminal ;

- la figure 42 est une représentation schématique d'une autre application du terminal de la présente invention ;

- la figure 43a est une représentation schématique d'une autre application encore du terminal de la présente invention ;

- la figure 43b montre un terminal du type pendentif ;

- la figure 44 montre une configuration de réseau sans fil ;

- la figure 45 montre un détail d'une configuration de réseau sans fil ;

- la figure 46 montre un autre détail d'une configuration de réseau sans fil ;

- la figure 47 est un diagramme synoptique d'une variante de configuration de terminal ;

- la figure 48 est un diagramme synoptique d'une variante de configuration de berceau ;

- la figure 49 est un diagramme synoptique d'une autre variante encore d'une configuration de berceau ;

- la figure 50 montre des données logicielles et le flux de commande dans le terminal ;

- la figure 51 montre des données logicielles et le flux de commande

dans un berceau ;

- la figure 52 est un diagramme synoptique montrant les composants d'un dispositif de mémorisation intégrée ;

- la figure 53 est un diagramme synoptique montrant une configuration d'une variante de dispositif de mémorisation ;

- la figure 54 est un diagramme synoptique montrant la configuration d'une autre variante encore d'un dispositif de mémorisation ;

- la figure 55 est un diagramme synoptique montrant le fonctionnement d'un système usuel de Dispositif Client et Carte d'Accès Fichier ;

- la figure 56 est un diagramme synoptique matériel d'une variante de système Dispositif Client et Carte d'Accès Fichier ;

- la figure 57 est un diagramme synoptique logiciel d'une variante de système à Carte d'Accès Fichier ;

- la figure 58 montre un modèle matériel destiné à un terminal validé pour le Web ;

- la figure 59 montre une structure de tâches pour l'agencement de la figure 58 ;

- la figure 60a montre un serveur web transparent :

- la figure 60b montre une carte serveur web transparente ;

- la figure 61a montre la navigation par rapport au serveur web transparent ;

- la figure 61b montre un autre aspect de navigation par rapport au serveur web transparent ;

- la figure 62 montre une variante de bloc de batteries inventif ;

- la figure 63a montre un agencement de bloc de batteries amélioré ; et

- la figure 63b montre une variante de bloc de batteries amélioré par rapport à celle représentée sur la figure 63a, sous forme arrachée.

Description Détaillée des Modes de Réalisation Préférés

Tout au long de la description du lecteur optique les termes "avant", "arrière", "supérieur", "dessus", "inférieur" et "dessous" sont utilisés de manière cohérente. En se référant, par exemple, à la figure 1, un lecteur optique présente une extrémité arrière 4 et une extrémité avant 5 généralement plane, une face supérieure 2a et opposée à cette dernière une face inférieure 2b.

En se référant à la figure 1, de manière plus détaillée, le lecteur optique comporte un boîtier allongé ayant d'une façon générale la forme d'une barre et désigné d'une manière générale par la référence numérique 1, ayant deux faces supérieure et inférieure 2a, 2b, longues et larges généralement opposées, deux faces latérales 3 longues, creuses généralement opposées, une extrémité arrière 4 et une extrémité avant 5.

Un dispositif de lecture est monté à l'intérieur du boîtier. Le dispositif de lecture peut être n'importe quel dispositif usuel connu, par exemple un scanneur optique à "spot mobile" ou un lecteur optique à "champ de vue". Généralement, le dispositif comportera une source génératrice de lumière telle qu'une diode laser, un agencement de focalisation ou d'orientation de faisceau et un dispositif de réception de la lumière. Lorsque le dispositif de lecture est un scanneur optique un composant de scannage pouvant osciller rapidement, tel qu'un miroir est prévu pour faire parcourir le faisceau lumineux à travers un indice destiné à être lu. En variante, la diode laser elle-même peut être oscillée. Lorsque le lecteur est un lecteur optique à champ de vue, un réseau de semi-conducteurs à couplage de charge (CCD), ou un agencement de photodétecteurs est prévu pour détecter le faisceau lumineux réfléchi.

Afin d'activer le dispositif de lecture un déclencheur de scannage 9 est prévu sur la surface supérieure 2a du boîtier 1. Le déclencheur 9 est activé par enfoncement et est positionné le long du boîtier 1 de manière qu'il soit facilement actionné par l'opérateur lorsque le lecteur est maintenu dans la main de l'opérateur. Le mécanisme du déclencheur lui-même peut être d'une configuration connue quelconque ; par exemple le déclencheur peut être chargé par ressort et comporter des contacts qui forment un circuit avec des

contacts à l'intérieur du boîtier lorsque l'on appuie sur le déclencheur pour actionner le dispositif de lecture.

Une fenêtre de scannage 10 est positionnée sur la face avant 5 du lecteur. La lumière générée par le dispositif de lecture passe à travers la fenêtre 10 et est réfléchie et diffusée vers l'arrière à travers la fenêtre 10 par un symbole 11 de codes à barres. En conséquence, le lecteur peut être facilement et précisément dirigé sur un symbole 11 de codes à barres destiné à être lu.

Sur la face supérieure du lecteur sont également prévus un clavier 14 et un afficheur 15. Le clavier 14 peut être utilisé pour initialiser le dispositif de lecture de manière que l'information d'identification concernant l'utilisateur soit entrée dans le système. En variante, le clavier 14 peut être utilisé pour entrer des informations ou des codes prédéterminés concernant des modes de fonctionnement du lecteur ou pour procéder à des opérations d'annulation ou de manipulation sur les informations fournies par le lecteur. L'afficheur 15 peut afficher des informations concernant le mode de fonctionnement du lecteur, ou afficher des informations de vérification concernant l'article portant le symbole de codes à barres qui est en train d'être lu conjointement avec des informations d'arrière-plan telles que l'heure, la date, et la confirmation de l'identité de l'opérateur. De préférence, l'afficheur 15 est un afficheur à cristaux liquides (LCD).

Le dispositif de lecture peut traiter des informations dérivées à partir des symboles de codes à barres directement ou peut envoyer des données brutes vers un dispositif de traitement externe qui peut alors traiter l'information en conséquence. De plus, l'information dérivée par le lecteur à partir des symboles de codes à barres peut être transférée vers un dispositif à mémoire de sorte qu'une base de données d'information puisse être constituée. Par exemple, lorsque le lecteur est utilisé à un point de vente, des profils d'achat peuvent être stockés et analysés. En variante, si le lecteur est utilisé à des fins d'inventaire, les informations d'inventaire peuvent alors être stockées. Le lecteur optique peut transmettre l'information de diverses manières. Dans les modes de

réalisation représentés, divers dispositifs de transmission différents sont prévus ; en pratique, seulement un ou plus d'un des dispositifs nécessitent d'être prévus en fonction de l'usage particulier auquel le lecteur est destiné. Par exemple, l'information peut être transmise par un modem acoustique 16. Dans ce cas, des informations peuvent être stockées dans une mémoire-tampon à l'intérieur du lecteur et ensuite téléchargées par le modem acoustique 16 à intervalles prédéterminés. L'afficheur 15 pourrait indiquer quand l'information devait être téléchargée. En variante, un connecteur d'interface, par exemple un connecteur du type RS41 est désigné par la référence numérique 6 et prévu à l'arrière du lecteur. Un câblage approprié peut être introduit dans le connecteur 6 pour télécharger des informations ou en variante pour charger des données dans le lecteur concernant par exemple le mode de fonctionnement. Une fois de plus, l'afficheur 15 pourrait fournir une indication sur le fonctionnement du connecteur. Le câble peut être connecté de manière permanente au lecteur étant donné que le connecteur 6 est prévu à l'arrière du lecteur et par conséquent ne serait pas caché par la main de l'utilisateur. En variante, le connecteur 6 pourrait être connecté à un câble pour l'envoi ou le téléchargement d'informations en cas de besoin et, par exemple, lorsqu'indiqué par l'afficheur 15. De plus, une radio 17 ou autre dispositif de transmission peut être prévu à l'intérieur du boîtier 1 pour permettre une communication de données en temps réel. Un avantage de ce dispositif est que l'opérateur peut utiliser le lecteur dans une configuration "sans cordon" ou "sans fil" permettant une mobilité accrue. Une fois de plus, la radio 17 pourrait comprendre un transmetteur et un récepteur de manière que l'information puisse être envoyée vers un processeur distant et à partir de ce dernier. La liaison radio pourrait être remplacée par une liaison de communication infrarouge ou autre liaison sans fil de type connu. Du fait que le lecteur est d'une conception ergonomique, le transfert des informations est facilement exécuté alors que le lecteur est réellement en utilisation, si nécessaire.

A titre d'option supplémentaire, le lecteur peut être configuré pour une

connexion à un réseau de télécommunications ou un réseau informatique, par exemple l'"Internet".

Un exemple de cas dans lequel le lecteur peut être d'un usage particulier est en relation avec le "worldwide web" ou "toile d'araignée mondiale". Lorsque l'on désire accéder à un site web, il est nécessaire d'entrer l'adresse du site, connue sous l'expression "adresse uniformisée de ressource (URL)". Souvent ces URL sont longues et complexes, et prennent du temps à être entrées et vérifiées manuellement. De plus, l'URL peut, en dépit de beaucoup de vérifications, donner lieu à des erreurs. Le problème se trouve exacerbé dans le cas d'utilisateurs néophytes en matière d'ordinateur. La manière de surmonter ce problème qui est proposée est de coder l'adresse URL dans un symbole de codes à barres et de lire le symbole de codes à barres avec le lecteur pour un accès automatique au site web correspondant, ce qui sera rapide et précis, donnant lieu à une marge beaucoup plus faible d'erreur. Le lecteur peut être utilisé pour établir une interface avec un terminal pour l'entrée de l'adresse URL ou pourrait être utilisé de manière indépendante.

Selon un autre aspect, il est montré sur la figure 9 un dispositif de collecte de données comprenant un perfectionnement par rapport aux réalisations connues. Le dispositif comprend un ordinateur portable qui tient dans la main pour collecter des données et télécharger les données traitées brutes vers un dispositif central ou périphérique. Le dispositif, désigné d'une manière générale par la référence numérique 20 comprend un corps principal 21 et des modules de collecte de données interchangeables 22a, 22b, 22c.

Le corps principal 21 est pourvu en interne de moyens de traitement de données (non représentés) et comprend également un écran d'affichage 23, par exemple un écran d'affichage LCD capable d'afficher des images vidéo, une interface de module de collecte de données 24, un clavier 25 optionnel de saisie d'information et une liaison de communication 26 qui peut comprendre des moyens de transmission infrarouge ou à fréquence radio ou une interface pour télécharger l'information vers un dispositif central ou périphérique via un

câble physique. Il est à noter que l'afficheur LCD 23 et le clavier 25 de saisie sont des caractéristiques optionnelles. Avantageusement, cependant, ils permettent à l'utilisateur de configurer le fonctionnement du dispositif dans son ensemble rapidement et simplement et de contrôler le fonctionnement. Le corps principal est représenté schématiquement sur la figure 9 ; en pratique, il pourrait revêtir une forme ergonomique telle que celle représentée sur la figure 1, des interfaces et autres adéquates étant positionnées de manière appropriée, par exemple, aux extrémités respectives du module.

Il est à noter que le dispositif peut transférer l'information vers un hôte via n'importe quel schéma de transfert de données électronique - par exemple le système pourrait également utiliser des voies téléphoniques à base cellulaire.

En variante, le dispositif pourrait être configuré pour une connexion à un réseau de télécommunications ou un réseau informatique, par exemple l'"Internet".

Les modules de collecte de données sont interchangeables les uns avec les autres et peuvent être, par exemple, des modules de capture de données d'images à base CCD (semi-conducteur à couplage de charge), données vidéo et données de symbole de codes à barres, des transducteurs audio pour collecter et recevoir des informations sonores, des scanneurs d'images lasers ou des modules de collecte de données multimédia combinées.

Un module de capture d'images utilisant un CCD peut être utilisé pour capturer des images d'objets pour stockage ou utilisation par une application processeur exécutée par le corps principal ou par un hôte, de telles images comprenant par exemple des personnes, des paysages, des maisons et des véhicules pour des applications de référence. De plus, l'imageur peut être utilisé pour des symboles de codes à barres à une ou deux dimensions pour décoder la capture de données. Un module de scannage du lecteur optique laser et un décodeur ne serait utilisé généralement que pour la capture et le décodage de données de codes à barres.

Un module multimédia 22 est représenté sur la figure 11 et est décrit plus en détail en référence à ladite figure ci-dessous. Un tel module peut contenir un circuit pour la capture d'images/vidéo, la capture audio et la reproduction et un sous-système de téléphonie cellulaire. Un tel module serait d'un usage particulier en matière de téléconférence et de communication vidéo en direct sur des réseaux cellulaires à partir de l'unité portable.

Le module de collecte de données souhaité 22a, b, c est connecté au corps principal 21 par l'interface 24 correspond à une interface 27 située sur le module. Tous composants d'interface connus appropriés peuvent être utilisés mais les composants doivent être solides relativement rigides, durables et appropriés pour des déconnexions et des reconnexions fréquentes.

Les modules sont alimentés par une alimentation électrique située à l'intérieur du corps principal du dispositif informatique portable et peuvent être partiellement ou totalement contrôlés par des pilotes logiciels implantés à l'intérieur du corps principal. Afin de réduire la charge sur l'unité de traitement centrale du corps principal, une électronique de traitement de signal dédié située à l'intérieur des modules peut être agencée pour exécuter un traitement des données en avant-plan en conséquence de quoi une architecture à bus commun au corps principal est partagée par tous les modules. En conséquence, leur interchangeabilité est améliorée.

Une architecture appropriée pour un module 28 de capture de média optique (par exemple contenant un imageur CCD ou un scanneur laser) est représentée sur la figure 10. Chaque module peut contenir seulement l'électronique de capture de média sans aucune capacité de traitement préalable ou, comme mentionné ci-dessus, contient de préférence des composants 32 analogiques dédiés ou programmables et des composants 33 de traitement de signaux numériques (DSP) pour alléger la charge de traitement placée sur l'unité de traitement centrale du corps principal 21. Le sous-système 32, 33 de traitement de signaux numériques prévu dans le module peut être d'une conception électronique unique commune à différents

modules, et est soit programmé en usine ou personnalisé à l'achat ou programmable par l'utilisateur pour exécuter les fonctions dans les processeurs si le module de média particulier le nécessite. Il est prévu que cette programmabilité des fonctions soit réalisée principalement par logiciel, étant donné que l'électronique de traitement des modules est flexible, et ces composants logiciels peuvent être chargés une fois ou dynamiquement vers le module via l'unité de traitement central du corps principal. En conséquence, la gamme de composants qui nécessitent d'être fabriqués est réduite, des parties dédiées appropriées des composants pouvant être choisies pour un usage souhaité, ou une partie du mode de fonctionnement étant à la charge du logiciel.

En exploitation, le module 28 collecte des informations via l'imageur CCD ou le scanneur laser sous une forme analogique qui est transformée soit en série soit par conversion dans un format parallèle. Le signal analogique est ensuite traité par le sous-système 32, 33 de traitement de signaux numériques et dirigé vers un bus d'interface 34 à partir duquel l'information est transférée vers le corps principal du dispositif informatique portable. Comme mentionné ci-dessus, l'électronique de traitement de signaux exécute de préférence un traitement des données d'avant-plan, si bien qu'une architecture à bus commun peut être conférée au dispositif informatique portable 21.

En se référant maintenant à la figure 11, le module multimédia 22 comporte un circuit pour la capture d'images/vidéo, la capture audio et la reproduction et un sous-système de téléphonie cellulaire.

Le module est agencé pour recevoir et transmettre des informations vidéo indépendamment du corps principal du dispositif informatique portable (bien que le corps principal du dispositif informatique portable puisse également accéder à l'information vidéo afin de contrôler ou de réviser l'information). En conséquence, une antenne 41 radiofréquence est prévue dans le module pour la réception et la transmission d'informations radiofréquence. Un processeur frontal 42 radiofréquence et un codeur/décodeur 43 coopèrent pour effectuer

des conversions de formats numériques vers radiofréquence/radiofréquence vers numériques. L'information vidéo reçue par fréquence radio est décompactée par un sous-système 44 de traitement de signaux numériques optionnel pour la présentation, lorsque cela est approprié, vers la CPU (unité centrale de traitement) du corps principal 21 du dispositif informatique portable. Un autre sous-système 45 de traitement de signaux numériques est prévu à d'autres fins (décrites plus en détail ci-dessous) et exécute de préférence un traitement vidéo partiel, la CPU du dispositif informatique personnel achevant le processus destiné à l'affichage des résultats. Le second sous-système 44 de traitement de signaux numériques peut également être requis pour l'interface avec le codeur/décodeur radiofréquence 43 du sous-système cellulaire ; cela dépend de la quantité de traitements nécessités pour chaque fonction. L'information vidéo transférée vers le corps principal 21 du dispositif informatique portable est affichée sur le dispositif d'affichage LCD 23. L'appareil de réception, transmission et traitement radiofréquence 41, 42, 43, 44 décrit ci-dessus peut résider de manière optionnelle dans un composant séparé tel qu'une carte PCMCIA (architecture internationale de cartes-mémoire d'ordinateurs individuels) ou autre carte du type enfichable par exemple du type fabriqué par la Société Symbol Technologies, Inc. De préférence, cependant, le circuit constitue une partie intégrante du module multimédia afin de fournir une solution multimédia complète sans fil pour un système informatique qui tient dans la main. Comme on pourra le noter, la liaison sans fil peut se conformer à toute norme cellulaire souhaitée (par exemple CDMA, GSM, AMPS) qui est de préférence choisie pour permettre l'application la plus large de l'invention.

Le module multimédia 22 comporte de plus un composant microphone/haut-parleur 50 qui reçoit et transfère des informations analogiques d'entrée vers un convertisseur analogique/numérique 51, 45 comprenant un convertisseur 51 d'avant-plan de bande vocale qui transfère l'information soit en série soit en parallèle vers le sous-système 45 de traitement de signaux numériques. De manière similaire, l'information peut être transmise dans l'autre

direction, par exemple l'information numérique provenant du corps principal du dispositif informatique portable est convertie en un signal audio analogique au convertisseur 45, 51 et convertie en son par le composant haut-parleur 50. Les données audio numériques en base de bande sont traitées par le sous-système 45 de traitement de signaux numériques qui peut être reprogrammé de manière adéquate pour exécuter un traitement codec audio approprié. Les signaux à bande téléphonique (VB) sont convertis par le convertisseur 45, 51 comme décrit ci-dessus.

Les données vidéo sont capturées par un imageur 52 à CCD, compressées par un sous-système 53 de traitement de signaux numériques et dirigées vers le codec (codeur/décodeur) radiofréquence 43. Une fois de plus, le corps principal du dispositif informatique portable ne nécessite pas d'être impliqué dans ce transfert de données à moins que l'utilisateur décide de superviser le transfert. Dans ce cas, un traitement contrôlé par logiciel peut être amorcé de manière que les données vidéo soient envoyées vers la CPU du corps principal 21 du dispositif informatique portable pour affichage avant la compression de même que vers le codec 43 radiofréquence pour transmission, ce qui permet à l'image capturée d'être visualisée pendant ou avant la transmission.

Le module multimédia 22 est monté de préférence de manière à pouvoir pivoter sur au moins 180? lorsqu'il est connecté au corps principal du dispositif informatique portable. Ceci peut être réalisé en articulant ou en faisant pivoter ou en agençant d'une autre manière une partie du corps principal ou en agençant de manière similaire une partie du module. Ce positionnement permet la capture de l'image de l'utilisateur pendant que l'utilisateur peut simultanément visionner l'affichage de l'écran LCD pour les données vidéo ou images reçues. La rotation de la partie de capture d'images du module permet la capture d'images d'objets se trouvant en face de l'utilisateur pendant que l'utilisateur regarde vers l'écran.

La combinaison microphone/haut-parleurs peut être agencée de manière

à faire face à l'utilisateur dans une configuration préférée, classique du dispositif comme un ensemble. Le microphone peut de plus être configuré pour pivoter ou s'orienter à l'écart du corps principal du dispositif informatique portable et de l'utilisateur tenant le dispositif si les données audio souhaitées destinées à être capturées émanent d'une autre direction.

Un agencement approprié comportant une tête de module orientable 22 et une perche de microphone pivotante 30 est représenté sur la figure 12. Dans le mode de réalisation représenté, une partie supérieure 21a du corps principal 21 est articulée sur le reste du corps principal et peut pivoter autour d'un axe A comme représenté par la flèche A'. Le module multimédia 22 est connecté à la partie supérieure et la partie supérieure a été inclinée de manière qu'un dispositif de capture d'images à CCD 29 soit en face de l'utilisateur. La perche de microphone pivotante 30 fait également saillie à partir du module multimédia 22. Il pourra être noté qu'un nombre d'agencements d'orientation pivotante peut être prévu, par exemple une articulation ou un pivot peut être prévu à l'intérieur de la structure du module 22, et le module pourrait également être agencé pour pivoter sur 180? autour d'un axe transversal par rapport à l'axe A. De manière similaire la perche du microphone 30 peut être montée de manière pivotante sur le module 22 de n'importe quelle manière connue.

En conséquence, il sera entendu que l'invention peut être utilisée pour fournir des possibilités multimédia modulaires programmables dans le facteur de forme "qui tient dans la main" par des dispositifs informatiques portables tels que des terminaux tenus à la main ou des "assistants numériques portables". L'invention peut être utilisée pour le décodage de codes à barres à base de CCD (dans une ou deux dimensions au moins) par des utilisateurs industriels et commerciaux, par exemple dans le traitement de points de vente ou des travaux d'inventaire ; des conférences vidéo cellulaires portables par des utilisateurs "d'affaires" itinérants ; et des captures de photographies numériques/d'images pour des experts en assurances, des professionnels de la vente parmi de nombreuses autres applications qui seront évidentes pour

l'homme de l'art. Il pourra être noté que les modules portables décrits ci-dessus peuvent être utilisés dans des configurations de scannage sans cordon par exemple dans des applications de points de vente. Des problèmes sont soulevés là où de tels dispositifs portables ne sont pas attachés d'une quelconque manière étant donné qu'il est possible qu'ils peuvent être égarés, retirés du magasin ou détournés d'une autre manière.

Pour surmonter cela, il est possible d'introduire des balises de surveillance d'un type connu dans le scanneur si bien que si le scanneur est accidentellement pris par un consommateur, une alarme sonnera en face du magasin comme elle sonnerait si un autre produit portant une telle balise de surveillance était sorti du magasin.

En variante, le scanneur peut comporter une forme quelconque d'alarme interne qui sonne si le scanneur est pris sur une distance plus grande qu'une distance prédéterminée à partir de la base. Lorsque le scanneur communique avec la base par communications sans fil telles qu'une communication radio, le protocole logiciel gérant la session radio peut contrôler le localisateur de portée et l'alarme.

Afin de localiser les scanneurs portables qui ont été égarés, une alarme ou un émetteur de signaux sonores dit "beeper" peut être placé dans le scanneur et déclenché par un signal à partir de la base contrôlée par, par exemple, un bouton prévu sur la base sur lequel l'utilisateur appuie. En conséquence, lorsque l'utilisateur appuie sur un bouton, le scanneur pourrait être localisé en suivant le bruit du son.

Une autre utilisation pour les dispositifs informatiques portables est l'application de service de messagerie ou de boîte à lettres électronique. En se référant aux figures 13 à 15, l'invention propose une architecture améliorée pour les systèmes de boîte à lettres électronique comportant des dispositifs informatiques portables. Le système perfectionné utilise une architecture de service de messagerie distribuée, basée sur des traitements coopératifs. A l'intérieur d'un réseau, une machine particulière est désignée en tant que

serveur et son adresse devient publique sur le réseau local. Le serveur est responsable de la distribution des messages et de la réception des messages et fournit également d'autres machines sur le réseau local avec des informations concernant l'état du message utilisateur, par exemple si un message a été reçu pour un utilisateur identifié, auquel cas le message peut être dirigé vers l'utilisateur. Les machines restantes sont dénommées "le client" et exécutent un traitement correspondant, en particulier fournissent une interface utilisateur au service de messagerie distribuée. Par exemple, la partie client peut présenter diverses options à l'utilisateur par exemple, les options d'écoute des messages audio ou de visualisation des textes ou des images fixes. Les options présentées seront, évidemment, basées sur les ressources disponibles sur une machine particulière, par exemple selon qu'elle possède une carte son et/ou des fonctionnalités graphiques.

En se référant plus particulièrement à la figure 13, il est prévu un serveur 100 et une pluralité (montrée en 2 sur la figure) de clients 101a, 101b. Le serveur 100 comporte une antenne 102 pour communiquer avec des clients distants 101a, 101b (par exemple des dispositifs informatiques portables), un module 103 de transmission et de réception, un codeur et décodeur 104 de message (pile de protocoles) et un module de traitement 105 (moteur de recherche) pour traiter les requêtes provenant des clients 101, par exemple concernant l'état d'un message utilisateur particulier, l'accès à l'un quelconque des tels messages, etc. On accède à l'information à partir d'une mémoire 106 qui peut être un module de stockage de base de données. Le processeur 105 communique également avec un module d'agent d'utilisateur de messagerie (UMA) 107 assurant l'interface utilisateur avec le serveur 100. Le serveur 100 est de plus en communication via l'agent d'utilisateur de messagerie 107 avec un réseau local d'entreprise et/ou un réseau à grande distance désigné d'une manière générale par la référence 108.

Le service peut faire partie intégrante d'un réseau de télécommunication ou d'un réseau informatique, par exemple l'"Internet" ou être configuré pour être

connecté à ce dernier.

Chaque client 101a, 101b comporte divers modules communs au serveur conjointement avec des modules supplémentaires spécifiques aux besoins du client. Le client 101 comporte une antenne 109 pour la communication avec le serveur et un module de transmission/réception 110 communiquant avec un codeur et décodeur de messages 111. Le module 110 comportera l'équipement matériel nécessaire pour mener à bien les étapes de transmission/réception mais il doit être indiqué qu'au moins certaines des fonctions fournies par le module devront être capables d'être fournies par voie logicielle. En fait, d'une manière générale, la référence des modules ne nécessite pas d'être constituée par du matériel dédié mais s'étend vers du logiciel programmé ou programmable configuré pour émuler des performances matérielles. Le codeur et décodeur 111 de message interagit avec l'agent d'utilisateur de messagerie 112 fournissant l'interface utilisateur. De plus, l'agent d'utilisateur de messagerie 112 communique avec un dispositif de mémorisation de données locales 113 et avec des modules optionnels tels qu'un gestionnaire d'affichage 114 et/ou un gestionnaire de son 115 (voir client 101a).

Le fonctionnement du système de messagerie distribuée peut être compris de la meilleure manière en se référant aux figures 14 et 15. La figure 14 affiche les étapes exécutées par l'utilisateur dans un "traitement client" typique. Au départ des opérations, le client s'auto-configure sur la base des ressources (par exemple sonores ou graphiques) disponibles sur la machine [étape 120]. L'utilisateur débute une session et entre un mot de passe [121] et une connexion est établie entre le client et le serveur [122], étape à laquelle l'information entrée pendant le processus de début de session et d'entrée de mot de passe est envoyée dans le serveur pour vérification [123]. Si, cependant, le serveur n'est pas prêt pour la communication, la procédure est alors interrompue [124] et doit être recommencée à l'étape 120 ou à l'étape 121. Après que l'état de l'utilisateur a été l'objet d'une recherche [123], si

l'utilisateur ou le mot de passe est inconnu du serveur, le traitement retourne à l'étape [121] et la procédure de début de session et d'entrée de mot de passe est réamorcée. Autrement, les options disponibles pour l'utilisateur sont recherchées [125] dans des étapes discutées plus en détail en se référant à la figure 15 et affichées comme en-têtes à l'intention de l'utilisateur [126]. L'utilisateur entre ensuite sa sélection [127] et le type de sélection est déterminé [128].

Le client évalue si l'utilisateur souhaite visualiser un message [129] et dans ce cas recherche le message sélectionné à partir du serveur [130] dans une série d'étapes décrites plus en détail ci-dessous en se référant à la figure 15. Le client détermine ensuite le type de message, par exemple audio ou visuel [131] et en fonction du type de message soit affiche le texte [132] ou reproduit le son [133]. Le client retourne alors à l'étape [127] et attend une autre sélection par l'utilisateur.

Si à l'étape [129] l'utilisateur indique qu'il n'est pas souhaité de visualiser un message alors un message est créé [134], enregistré [135], les données du message sont mises en forme de manière appropriée pour le transport [136], par exemple par la pile de protocoles 111 représentée sur la figure 13 et sont envoyées vers le serveur [137] par le transmetteur 110 et l'antenne 109. Le client retourne alors à l'étape [127] et attend une autre sélection par l'utilisateur.

La machine cliente comporte des moyens d'entrée appropriés, par exemple un clavier et un dispositif d'affichage par exemple un affichage LCD pour l'entrée des choix de sélection de l'utilisateur, l'information concernant les messages et pour l'affichage des messages. De plus, un haut-parleur et un microphone peuvent être prévus pour l'enregistrement et la reproduction des messages audio. Un dispositif informatique portable tel que celui représenté sur la figure 9 peut, par exemple, être utilisé en tant que client 101. Dans ce cas, l'auto-configuration du client est réalisée partiellement en fonction du type de module 22 introduit dans le corps principal 21 du dispositif informatique portable 20.

En se référant à présent à la figure 15, les étapes d'un "traitement serveur" typique sont représentées. Le serveur opère comme un traitement continu mais, afin d'économiser les ressources systèmes, est principalement dans un mode d'attente lorsqu'il est simplement à l'écoute du réseau local. En conséquence, à l'étape [140], au lancement, une connexion ouverte est établie et le serveur supervise la connexion [141]. Si des requêtes sont reçues [142] le serveur poursuit les étapes subséquentes mais autrement continue à superviser la connexion [141]. A la réception d'une requête, le serveur "se réveille", interprète la requête pour déterminer lequel des modules internes du serveur est désigné [143] (par exemple le dispositif de mémorisation de base de données 106 ou l'agent d'utilisateur de messagerie 107) et si la demande est valide [144], le type de demande est déterminée [145]. La demande peut être un EN-TETE qui est envoyé vers le client pour présenter des en-têtes de message utilisateur (correspondant aux étapes [125] et [126] représentées sur la figure 14) ; en conséquence, à la demande pour un en-tête [146], l'information appropriée est recherchée [147], est mise en forme pour le transport [148], par exemple aux modules 104, 103 du serveur et est envoyée vers le client [149]. Le serveur retourne alors au mode de surveillance [141] à l'écoute de la connexion avec le reste du réseau.

Si à l'étape [146] la demande ne concerne pas une information d'EN-TETE, alors le serveur recherche tous messages utilisateurs [147] qui ont été mémorisés concernant l'utilisateur identifié (par exemple sur la base des informations de début de session ou de mot de passe entrées au niveau du client) et les données sont mises en forme et envoyées comme décrit ci-dessus à propos des étapes [148, 149]. Le système retourne alors au mode de surveillance [141].

On constatera que les étapes [142-147] sont exécutées par le moteur de recherche 105 du serveur, les données de message utilisateur étant recherchées depuis le dispositif à mémoire 106 du serveur.

Lorsque, à l'étape [144] la demande n'est pas valide, l'utilisateur et la

demande sont alors enregistrés et un message d'erreur est retourné vers le client [151]. Le système retourne alors au mode de surveillance [141].

Le système décrit ci-dessus nécessite beaucoup moins de mémorisation de données sur le terminal/ordinateur client et ainsi est particulièrement (bien que non exclusivement) approprié aux ordinateurs tenus dans la main dotés de possibilités réseau de base. Le système résout ainsi le problème de la localisation des boîtes à lettres de même qu'il décharge l'hôte tenu à la main de la responsabilité de la mémorisation et de la recherche des données en traitant le service de messagerie comme deux processeurs coopératifs et indépendants qui communiquent l'un avec l'autre en utilisant des protocoles réseaux de base.

En effet, à la différence des systèmes de service de messagerie usuelle, le service de messagerie distribuée utilise le réseau sous-jacent pour présenter activement les interrogations au serveur concernant l'état des messages se rapportant à un utilisateur particulier, plutôt que d'utiliser une structure de répertoire et de se fier à un système de fichier. Du fait que toutes les interrogations sont dirigées vers un serveur, des connexions multiples pour un utilisateur unique peuvent être identifiées et déniées, le serveur est le seul point de connexion vers les entités externes, offrant un système de distribution plus sécurisé et le serveur offre une visualisation du service de messagerie à l'utilisateur final qui est indépendante du matériau réel mémorisé par le serveur.

De plus, les clients sont déchargés de la responsabilité de la mémorisation ou de la recherche directe de l'une quelconque des données réelles. Les messages sont délivrés via le réseau à la demande, c'est-à-dire lorsque requis par l'utilisateur, et la portion client du service de messagerie distribuée traduit simplement les demandes de l'utilisateur en une série de commandes qui sont envoyées vers le serveur sous la forme de requêtes. Si les requêtes sont validées le serveur retourne les données nécessaires à un client en réponse aux requêtes. En vertu de la séparation des tâches, le concepteur du système acquiert la liberté de modifier les composants du

système indépendamment. Par exemple, il peut être décidé à l'origine que le serveur mémorise les messages en utilisant un schéma de boîte à lettres simple, mais si la capacité ou la vitesse ou l'efficacité du système nécessite par la suite d'être améliorée suite à la charge accrue placée sur le système par un nombre croissant d'utilisateurs et de messages, le serveur peut revenir vers l'utilisation d'un système complet de gestion de base de données. Toute modification de ce type restera, cependant, cachée à partir de la portion client et la portion client peut effectivement rester dans l'ignorance des structures sous-jacentes du serveur indéfiniment.

De manière similaire, la portion client peut être modifiée, par exemple, pour passer d'une interface utilisateur basée sur le mode caractère vers une interface du type graphique auquel cas le serveur peut rester dans l'ignorance des modifications étant donné que les requêtes de données de base et le mécanisme d'échange restent inchangés, le serveur restant indifférent au mode de présentation des données à la portion cliente.

En conséquence, un système de messagerie vocale est implémenté. La portion cliente peut tourner sur une plate-forme compatible PC (ordinateur individuel) bien qu'elle puisse être portée de manière très simple vers d'autres plates-formes. Le serveur peut fonctionner sur des plates-formes UNIX ou DOS. Le client nécessite moins de 256 kilo-octets de stockage local.

On verra par conséquent, que le système de distribution proposé offre de multiples avantages par rapport au schéma de boîte à lettres actuel, en fournissant des modules flexibles et indépendants qui sont plus simples à maintenir et à modifier et qui offrent un mécanisme générique par lequel des transferts de données peuvent être implémentés sur des réseaux de données. Etant donné que le système est distribué, il ne nécessite pas la présence d'un système de fichier réseau et repose simplement sur le stockage local.

En particulier, du fait qu'un serveur est prévu sur chaque réseau local pour traiter les clients à l'intérieur d'un réseau local et également pour communiquer avec d'autres serveurs sur d'autres réseaux locaux, les capacités

itinérantes du système sont améliorées. La répartition du traitement des messages entre les divers réseaux locaux se démarque du système à concentrateur centralisé des systèmes de messagerie usuelle et autorise un traitement et un transfert simplifiés et accélérés des messages en combinaison avec ordinateur portable itinérant.

D'autres aspects de la présente invention seront décrits conjointement avec les réseaux sans fil à spectre étalé de la Société Symbol Technologies Inc. : Spectrum One (fonctionnant à une plage de fréquence de 902 à 928 MHz) et Spectrum24 (fonctionnant à une plage de fréquence de 2,4 à 2,5 GHz). Cependant, les modes de réalisation décrits sont applicables à d'autres systèmes de communication sans fil.

Partie 1 : Programme d'Emulation de Terminal "Symbol" (STEP) et unités mobiles/terminaux à base de stylet.

Le programme d'émulation de terminal "Symbol" (STEP) est un outil utilisé pour formater des applications pour des unités mobiles à base de stylet telles que l'unité mobile 21 représentée sur la figure 9.

Un exemple du système Spectrum24 est représenté sur la figure 16. Le STEP réside dans les unités mobiles 21 et travaille avec un système de développement de validation 160 sur un ordinateur hôte 162 afin d'exécuter un jeu prédéfini de commandes envoyé à partir de l'ordinateur hôte 162. Le système de développement de validation 160 inclut un serveur de validation 164, une interface de programme d'application de validation 166 et un compteur 168. Le système de développement de validation 160 reçoit une entrée à partir de l'unité de point d'accès au Spectrum24 170. L'ordinateur hôte 162 est contrôlé par un terminal 172 pour exécuter des applications hôtes 174.

Le STEP fournit aux unités mobiles 21 l'interface et les fonctions logiques nécessaires pour communiquer sur le réseau hertzien, et contrôle toutes les fonctions d'entrée, de sortie et d'affichage au niveau de l'unité mobile, y compris la gestion des claviers, des écrans d'affichage, des

scanneurs et périphériques et de l'imprimante.

Le STEP fournit des commandes qui autorisent l'administrateur à créer une sélection de champs d'entrée de données à partir de l'opérateur de l'unité mobile. Par exemple, ces commandes devraient permettre à l'opérateur de : (a) entrer des données à partir d'un clavier et scanneur des codes à barres ; (b) envoyer des messages multiples vers l'hôte dans la même transaction ; et (c) contrôler le type de données entrées et valider les données entrées. De plus, à des fins d'affichage, STEP permet à l'administrateur de (a) afficher des données à n'importe quel emplacement sur l'écran de l'unité mobile ; (b) effacer entièrement l'écran de l'unité mobile ou effacer une seule ligne ; (c) sauvegarder et restaurer l'écran de l'unité mobile ; et (d) contrôler les effets de contre-jour pour visualiser l'écran dans l'obscurité.

Le STEP agit comme un gestionnaire de la consommation d'énergie pour réduire les demandes sur les batteries dans les unités mobiles 21, permettant à ces derniers de fonctionner plus longtemps entre des charges et de prolonger leur durée de vie globale.

En installant STEP sur les unités mobiles 21, des formulaires peuvent être créés et affichés sur l'écran d'affichage 23 (montré sur la figure 9). Les formulaires peuvent inclure des messages, des invites et des champs d'entrée de données. Ceci permet à un opérateur de rappeler un formulaire stocké pour son exécution sur l'unité mobile 21 ; répéter l'exécution d'un formulaire stocké pour un traitement par lot en ligne ; et effacer tous les formulaires stockés et déterminer la date et l'heure de la dernière définition du formulaire.

Les unités mobiles 21 équipées du programme STEP permet à l'ordinateur hôte 162 de lire les fichiers de données stockés dans l'unité 21 ; de faire sonner l'alarme de l'unité mobile 21 ; d'interrompre l'activité d'entrée de l'unité mobile 21 ; et de déconnecter l'unité mobile 21 de l'ordinateur hôte 162. Ceci permet à l'opérateur d'utiliser l'unité mobile 21 pour collecter des données sans être connecté à l'ordinateur hôte 162 ; à régler et sauvegarder des paramètres systèmes ; à télécharger des fichiers à partir de l'ordinateur hôte

162 vers la mémoire de l'unité mobile 21 ; et d'exécuter d'autres tâches de maintenance.

La figure 17 illustre un organigramme usuel typique des actions entreprises par le point d'accès 170 lorsqu'il reçoit un paquet de données à partir de l'unité mobile 21 sur le réseau sans fil. Si le paquet est un paquet de l'enregistrement, comme déterminé à l'étape 200, alors le point d'accès 170 traite l'information portée par le paquet à l'étape 214. Le type d'association est déterminé en examinant l'adresse IP du point d'accès d'accueil de l'unité mobile 21 et effectue les échanges de message de contrôle en conséquence aux étapes 216 et 226. Si le paquet n'est pas un paquet de l'enregistrement, comme déterminé par l'étape 200, alors le paquet est désencapsulé à l'étape 202.

Si les tables de conversion d'adresses à court terme (ST-AMT) du point d'accès 170 possèdent une entrée pour l'adresse MAC (Medium Access Control ou commande d'accès physique) source du paquet, comme déterminé à l'étape 204, alors le paquet a été délivré à partir de l'unité mobile 21 qui est éloignée de son réseau de liaison de donnés stationnaire (SDL) d'origine et le traitement passe à l'étape 218. A l'étape 218, le point d'accès 170 encapsule le paquet à l'intérieur d'un paquet UDP avec le jeu d'adresses de destination IP vers celle du point d'accès d'origine de l'unité mobile 21.

Si les tables de conversion d'adresses à long terme (LT-AMT) du point d'accès 170 possèdent une entrée pour l'adresse MAC de destination du paquet, comme déterminé à l'étape 206, alors le paquet est destiné à une unité mobile qui est actuellement à l'extérieur de son groupe de point d'accès d'origine (GPA) et le traitement progresse vers l'étape 220. A l'étape 220, le point d'accès 170 encapsule le paquet à l'intérieur d'un paquet UDP avec le jeu d'adresses de destination IP vers le point d'accès local de l'unité mobile destinataire.

Si l'adresse MAC de destination du paquet est une adresse de diffusion totale, comme déterminé à l'étape 208, alors le paquet est retransmis à l'étape

222 sur ses interfaces câblées et sans fil. Si l'adresse MAC de destination dans le paquet apparaît dans la table de l'hôte mobile (MHT) du point d'accès, comme déterminé à l'étape 210, alors le paquet est encapsulé à l'intérieur d'un paquet de couches à liaison sans fil et retransmis sur l'interface sans fil à l'étape 224. Autrement, le paquet est retransmis sur son interface câblée à l'étape 212.

Partie 2 : Attribution des domaines et des adresses IP auxdites unités mobiles 21 à base de stylet.

Les modes de réalisation de la présente invention qui suivent traitent de l'attribution des domaines et des adresses IP aux unités mobiles 21 pour une exploitation dans une technologie RLE (réseau local d'entreprise) sans fil, telle que les systèmes Spectrum One et Spectrum24 précédemment décrits.

Selon un mode de réalisation de la présente invention les domaines et les adresses IP sont codés en mémoire morte. Le mode de réalisation codé en mémoire morte implique la définition du domaine et de l'adresse IP de l'unité mobile 21 dans les fichiers de configuration associés aux pilotes Spectrum24 et aux piles de protocoles.

Le mode de réalisation codé en mémoire morte assure une implémentation relativement simple de l'attribution du domaine et de l'adresse IP pour des installations de réseau Spectrum24 lorsque seulement quelques unités mobiles 21 qui utilisent toujours le même GPA (groupe de point d'accès) sur le même réseau sont utilisées. De plus, un degré élevé de sécurité est assuré et tant que la possibilité de détecter et d'attribuer des domaines et des adresses IP n'est disponible que dans la zone de configuration et non pas dans la zone opérationnelle.

La configuration codée en mémoire morte de chaque unité mobile 21 assure que les informations de domaine et d'adresse IP sont non-volatiles. Ceci assure que même le démarrage à froid de l'unité mobile 21 ne nécessite pas la reconfiguration. Tous les points d'accès 170 dans le GPA cible peuvent être

configurés pour utiliser le domaine codé en mémoire morte. Le serveur peut être configuré pour réserver de manière permanente (sans aucun délai) les adresses IP codées en mémoire morte pour une utilisation par chaque unité mobile 21 codée en mémoire morte.

Un autre mode de réalisation de la présente invention implique la sélection par l'application des domaines et des adresses IP. Ce mode de réalisation est approprié aux situations dans lesquelles un administrateur du système configure manuellement les unités mobiles 21 avant leur utilisation par des opérateurs en définissant le domaine et l'adresse IP. En particulier, lorsque des unités mobiles 21 sont les seuls noeuds du réseau ou lorsque l'administrateur du système défini des domaines et des adresses IP en se référant à une liste principale maintenue sur un serveur de réseau, le système de sélection par l'application est avantageux.

Pour des situations dans lesquelles l'opérateur doit identifier les sélections lorsqu'il se déplace entre des GPA (groupes de point d'accès) ou des réseaux, une application plus sophistiquée est proposée pour permettre à l'administrateur du système d'établir des noms logiques pour des domaines et des adresses IP de manière que les opérateurs puissent extraire les définitions appropriées en choisissant un nom significatif tel que camion, entrepôt, dépôt, etc.

La méthode de sélection par l'application permet l'ajustement dynamique des domaines et des adresses IP sous le contrôle de l'application à travers les GPA et les réseaux.

Un autre mode de réalisation de la présente invention implique l'attribution des domaine par les points d'accès et l'attribution des adresses IP par le serveur. Cette méthode est appropriée lorsque l'attribution manuelle des domaines et des adresses IP est impraticable en raison d'un grand nombre d'unités mobiles 21 ou en raison de la complexité du réseau.

L'attribution des domaines par les points d'accès nécessite de configurer les points d'accès 170 pour permettre une configuration automatique. En

utilisant les caractéristiques de la liste des contrôles d'accès (ACL) des points d'accès 170, la sécurité peut être améliorée en donnant au point d'accès 170 une liste des adresses en couche MAC de toutes les unités mobiles 21 autorisées. Cette liste peut être plus large que le nombre d'unités mobiles 21 réellement gérées à un instant donné, ce qui permet le temps partagé de la capacité du point d'accès 170 parmi un vaste jeu d'unités mobiles 21 en utilisation intermittente.

L'attribution des adresses IP par le serveur requiert l'existence d'un mécanisme à l'intérieur de la pile de protocoles, supporté des services et des utilitaires à la fois dans le serveur et dans l'unité mobile 21, pour permettre une allocation dynamique des adresses IP. BOOTP et DHCP sont deux mécanismes communs pour une allocation dynamique.

BOOTP travaille en ayant un fichier sur le serveur pour chaque unité mobile 21 possible, choisie par l'adresse de couche MAC unique de l'unité mobile 21, qui fournit l'adresse IP à utiliser pour cette unité mobile 21.

DHCP travaille en ayant une base de données sur le serveur qui enregistre les adresses IP qui sont en utilisation (par adresse de couche MAC) et les adresses IP qui sont disponibles pour l'attribution dynamique. Lorsqu'une unité mobile 21 demande une adresse IP, la base de données est interrogée pour l'adresse de couche MAC. Si une adresse IP est déjà allouée à cette unité mobile 21, alors elles est simplement retournée. Si aucune adresse IP n'est allouée à l'unité mobile 21, et une adresse est disponible pour une attribution dynamique, elle est allouée à l'unité mobile 21, enregistrée dans la base de données et attribuée à l'adresse de couche MAC de l'unité mobile, et retournée vers l'unité mobile 21. Le serveur DHCP peut être réglé pour marquer un dépassement de temps lorsqu'une adresse IP attribuée dynamiquement n'a pas été utilisée pendant un certain temps et la retourner vers la liste disponible ou bien pour maintenir les adresses IP attribuées de manière permanente une fois allouées à une unité mobile 21.

Les domaines et les adresses IP peuvent être stockés dans des

dispositifs de mémorisation volatile, mais nécessiterait d'être ré-entrés à la suite d'un réamorçage. Cependant, l'information d'adresses nécessaire peut être stockée à bord du flash de l'unité mobile 21, ou sur une carte adaptateur du Spectrum24, ou sur des disques en RAM (disque en mémoire vive) ou des cartes mémoires au format PCMCIA (architecture internationale de cartes-mémoire d'ordinateurs individuels).

Les méthodes d'attribution par point d'accès/serveur fournissent la possibilité de programmer des informations ACL (liste des contrôles d'accès) via un ordinateur personnel associé au même routeur câblé que le point d'accès 170. De plus, les méthodes d'attribution par point d'accès/serveur permettent une attribution automatique de domaines et d'adresses IP conformes comme requis, et permet une mobilité à travers les GPA (groupes de point d'accès) et les réseaux.

Selon un autre aspect, l'invention s'attaque au problème de la nécessité d'un programme spécialisé pour l'analyse et l'interprétation d'enregistrement de données à haute densité incorporées dans des étiquettes à codes à barres. Selon l'invention, il est proposé de répartir non seulement les données de codes à barres sur une étiquette à haute densité, mais également l'information décrivant comment créer une interface capable de lire les données à partir de l'étiquette d'enregistrement de données.

La mise en oeuvre de l'invention sera familière aux lecteurs expérimentés dans le fonctionnement des navigateurs du Web du réseau Internet approprié à la lecture, par exemple des fichiers écrits dans le langage de description de documents hypertextuels (HTML). Ces fichiers sont utilisés pour décrire une interface à construire par le navigateur Web. Dans la présente invention, l'unité mobile comporte un lecteur ou un navigateur pour scanneur une étiquette à codes à barres à haute densité qui contient un script de programme tel qu'un script au langage HTML, VB (Visual Basic) ou une version compressée spécialisée de l'un ou l'autre. Le script est analysé et interprété par le navigateur qui construit une interface utilisateur au moment de l'exécution et

la présente à l'utilisateur. L'utilisateur interagit avec l'interface en scannant des étiquettes de données et en interagissant avec l'un quelconque des contrôles du programme présentés à l'utilisateur pour traiter correctement les données. Selon un aspect, un niveau de nouvelle donnée ou interface peut être imprimé par l'utilisateur, lequel est appliqué à l'objet en cours de traitement. Il sera à noter que, étant donné que les densités d'étiquette à codes à barres augmentent, la capacité de stockage de l'interface réelle et de l'enregistrement de données dans une seule étiquette de codes à barres est évidente.

La figure 18 représente le système de l'invention avec plus de détails. Ce système comporte un explorateur ou navigateur 300 dans lequel des informations de codes à barres 301 sont entrées. Une interface 302 est construite au moment de l'exécution et un contrôle d'interface 303 est fourni. Le navigateur 300 comporte de plus un moteur d'acquisition de codes à barres 304, un moteur d'analyse 305, un moteur d'impression 306 avec une interface de données imprimées 307 et un moteur de communications 308 avec une interface 309 d'entrée/sortie de communication. L'utilisateur interagit avec l'interface via une autre interface 310.

Il sera à noter que la manière dont l'information est codée dans l'étiquette de codes à barres sera familière à l'homme de l'art, et que le logiciel et l'équipement matériel requis seront également familiers à l'homme de l'art.

Ce système est particulièrement avantageux en ce qui concerne le transport et l'identification de marchandises. L'expéditeur des marchandises peut distribuer une étiquette comportant un script de programme avec les marchandises qui est lue par le navigateur du récepteur. L'étiquette à script de programme expédiée avec les marchandises contient l'information requise pour permettre au navigateur de créer une interface au moment de l'exécution pour lire et traiter les données pour le conteneur de marchandises expédiées.

Les systèmes logistiques tirent un grand profit d'un système tel que celui-ci, du fait que des matières non identifiées dans le domaine peuvent être rapidement identifiées et traitées par toute unité contenant le navigateur.

L'administration de l'équipement matériel et du logiciel contenu dans ces systèmes est largement réduite, du fait que le navigateur contenu dans l'unité mobile (UM) demeure statique. Ce n'est que lorsque de nouvelles caractéristiques du navigateur nécessitent d'être distribuées que les UM doivent être mises à jour. Toutes les interfaces sont distribuées sur des étiquettes de codes à barres à haute densité. Ce système de distribution par programme d'application rend réellement le système informatique universel. Un nombre infini de différentes interfaces peut être lu dans le navigateur et exécuté par ce dernier. Les utilisateurs ne sont plus limités par des dispositifs de mémorisation secondaire sur leur unité mobile pour stocker des programmes d'application.

En utilisant ce nouveau système, tout système informatique équipé d'une application de lecture d'interface universelle (navigateur) peut créer une interface "à la volée" qui est capable de lire des informations de traitement sur les étiquettes d'enregistrement de données accompagnantes.

Les systèmes déployés dans le domaine ne nécessitent plus que leur programme d'application soit mis à jour lorsque des changements au fichier programme est nécessaire. Seule l'étiquette comportant le script de programme nécessite d'être remplacée. Le nombre de formats de données différents qui peut être traité par un système informatique particulier n'est limité que par le nombre d'étiquettes à script de programme disponibles pour l'utilisateur.

Les différents utilisateurs d'un tel système peuvent échanger librement des informations du fait que l'information d'interface nécessaire pour traiter les fichiers de données est distribuée sur une étiquette avec les fichiers de données proprement dits. Chaque utilisateur n'a plus besoin d'une copie du programme d'application spécialisée qui était précédemment nécessaire pour lire l'étiquette de données.

Selon un autre aspect de l'invention, il est proposé un objet COM (modèle de composant-objet) OLE (liaison et imbrication d'objet) de scannage de codes à barres pour communiquer des commandes et des données de

codes à barres sur une liaison sans fil. Comme décrit plus en détail ci-dessous, les objets utilisent l'automatisation OLE pour constituer une extension de contrôle OLE de développement "adjuvante". Il devient ainsi un objet d'automatisation OLE en processus. L'objet d'automatisation OLE en processus contrôle un dispositif de scannage de codes à barres sur une liaison sans fil sur un client distant. Le dispositif distant valide un lecteur de codes à barres et collecte les informations de codes à barres, retournant les données sur la liaison sans fil vers l'objet d'automatisation OLE.

Les principes généraux de l'architecture OLE sont bien connus de l'homme de l'art. Dans le présent mode de réalisation, un objet de scannage est implanté sous la forme d'un contrôle OLE. Les contrôles OLE sont des composants logiciels réutilisables conçus pour travailler dans des conteneurs qui supportent OLE 2.0. Les contrôles OLE sont plus puissants et plus flexibles que les systèmes précédents tels que les contrôles personnalisés VBX en particulier du fait que, contrairement au contrôle personnalisé VBX qu'il remplace, les contrôles OLE supportent les environnement 32 bits et ne sont pas limités à Microsoft Visual Basic (marque commerciale).

Les contrôles OLE sont conçus pour travailler dans tout conteneur qui supporte OLE 2.0 incluant non seulement Visual Basic 4.0 et au-delà mais également des applications conteneur supportant OLE tels que Microsoft Office (marque commerciale). De plus, les contrôles OLE travaillent dans des applications supportant OLE de sociétés tierces dans le domaine des outils de développement.

L'architecture OLE permet à des objets logiciel différents de communiquer les uns avec les autres en utilisant un mécanisme d'interface binaire. Ceci autorise des objets logiciels à être développés séparément les uns des autres et d'être liés très tard au moment de l'exécution. L'interface logicielle est un contrat entre le conteneur et le contrôle en ce qui concerne la manière dont les deux objets logiciels devront interagir et échanger des informations.

Sous l'architecture OLE, l'objet de scannage peut être placé et activé

dans l'un quelconque d'une variété de conteneurs qui supportent l'interface conteneur OLE. La figure 19 représente le mécanisme général entre un contrôle 401 et son conteneur 402. Comme on peut le voir, le mécanisme comporte des interfaces de document composite standard 403 et les interfaces de contrôle additionnels 404, chacune comprenant de multiples interfaces.

Dans un tel système, le contrôle de scannage apparaît comme une partie "sans couture" de l'environnement du conteneur. A travers les interfaces exposées les deux objets communiquent et s'intègrent l'un dans l'autre.

De plus, comme représenté sur la figure 20, le contrôle de scannage 401 communique sur une liaison sans fil 410 avec un client de calcul distant 411 pour contrôler le dispositif de lecture de codes à barres 412. Le contrôle de scannage 401 envoie des commandes sur la liaison sans fil 410 en créant des threads ou fils d'exécution séparés 413a à 413d qui envoient, reçoivent et synchronisent les transactions du lecteur de codes à barres sur la liaison sans fil. Comme représenté sur la figure 20, le conteneur 402 et le contrôle 401 OLE communiquent via des lignes 414a à 414f. Le contrôle OLE comporte un fil d'exécution de contrôle principal 415 qui communique avec le conteneur OLE 401 via des lignes 414a, 414b et avec un premier fil de transaction A 413a via une ligne 416. Chacun des fils de transaction 413a à 413d communique le long d'une ligne respective 414c à 414f avec le conteneur OLE 402.

Chacun des fils aboutit également par une première ligne respective 417a à 417d à une fonction 418 de diffusion de début de transaction et reçoit une entrée via une seconde ligne respective 419a à 419d à partir d'une fonction 420 de diffusion de transaction complète. La fonction 418 de diffusion de début de transaction communique avec une couche 421 de transport dans le client distant 411 via une ligne 422 et une fonction 420 de diffusion de transaction complète reçoit une entrée à partir de la couche de transport 421 via une ligne 423. Le client distant 411 comporte une couche de transport correspondante 424 qui aboutit via une ligne 425 à un gestionnaire d'arrivée de données 426 et reçoit une entrée via la ligne 427 à partir d'un gestionnaire 428 de commande

complète. Le gestionnaire 426 d'arrivée de données aboutit via une ligne 429 via un pilote 430 de dispositif de codes à barres et le gestionnaire de commande complète reçoit une entrée 431 à partir du pilote de dispositif de codes à barres 430. Le pilote 430 de dispositif de codes à barres communique avec l'équipement matériel de scannage tel qu'un lecteur 412 de codes à barres via une ligne 432.

En conséquence, les utilisateurs peuvent développer des applications utilisant des outils de développement supportant OLE tels que Visual Basic 4.0. L'utilisateur insère simplement un nouvel objet de scannage dans son projet, définit les propriétés requises, écrit le code nécessaire à la notification événementielle et le contrôle de scannage converse "sans couture" avec le dispositif de scannage de codes à barres du client distant sur la liaison sans fil. Pour le programme d'application, les choses se passent comme si le dispositif de scannage était résident sur son équipement matériel local. L'invention constitue un développement important par rapport aux architectures antérieures comprenant l'implémentation d'un scanneur de codes à barres local résidant sur une machine exécutant un objet COM. En particulier, l'architecture de l'invention permet le contrôle du scanneur à travers l'interface sans fil.

En vertu de la présente invention, il existe de plus la capacité de supporter des versions ultérieures destinées à être distribuées via l'architecture de modèle de composant-objet distribué (DCOM). Les interfaces entre le conteneur de contrôles et le contrôle lui-même sont binaires et peuvent être implémentées par le système d'exploitation en tant qu'appels de procédure distants (RPC). En conséquence, le contrôle OLE peut être implémenté en tant que contrôle Active-X pour contrôler des dispositifs sur une liaison Internet ou Intranet. Cette technologie permet à des auteurs et des développeurs Web de créer une nouvelle génération de gestionnaires de pages et d'applications Web interactifs, par exemple Microsoft Internet Explorer 3.0 (marque commerciale). Cette implémentation est particulièrement bénéfique dans des systèmes proposés par lesquels les utilisateurs souhaitent intégrer des capacités de

scannage de codes à barres dans leurs applications supportant Intranet/Internet.

L'Intranet a émergé de l'application de la technologie Internet pour fournir des applications critiques à mission de puissance industrielle à des utilisateurs à l'intérieur d'une organisation sur un RLE (Réseau Local d'Entreprise) isolé plutôt que pour une connexion externe à l'Internet mondial. Des terminaux de calcul tenus à la main à fonction unique peuvent alors être construits, lesquels se connectent au RLE et exécutent des applications prédéterminées pour réduire substantiellement le coût par client lorsqu'on installe un système réseau. Dans un système Intranet, les applications critiques à mission résident sur le serveur, éliminant le coût du déploiement de l'application et abaissant le coût de la configuration du terminal. Les données collectées sont transmises et sauvegardées sur le serveur, ainsi peu ou point de stockages de données en local est nécessaire sur le terminal tenu dans la main. On verra, par conséquent, qu'un tel système fournit un forum idéal pour l'objet de contrôle de scannage OLE décrit ci-dessus.

Une liaison Internet classique est représentée en se référant au diagramme schématique de la figure 2a, et à l'organigramme de la figure 2b et comporte un dispositif de données de terminal distant 501 comprenant, par exemple, un ordinateur portable, un PC (ordinateur individuel) ou une unité mobile comme décrit plus en détail ci-dessous, relié à un serveur 502 via une liaison appropriée 503 qui peut être une liaison téléphonique, incorporant un modem approprié, une liaison sans fil ou une liaison téléphonique cellulaire parmi d'autres possibilités qui sont évidentes à l'homme de l'art. Le serveur 502 est à son tour interconnecté via une ligne 504 à l'Internet comme représenté schématiquement en 505. Lorsque l'utilisateur souhaite accéder à un site web, l'adresse du site web est entrée au terminal 501 et le serveur 502 introduit le site web 506 à l'adresse donnée à partir de l'Internet 505. De manière similaire, lorsque l'utilisateur souhaite créer un site, l'information pertinente est entrée au terminal 501 et le site est créé via le serveur 502.

Bien que le système représenté sur la figure 2a permette l'accès centralisé à des sites et la création centralisée de sites, on notera que dans certaines circonstances le système est peu pratique, par exemple lorsqu'il est souhaité de créer un site très rapidement. De plus, tandis que dans certaines circonstances un utilisateur connaîtra simplement quelle information est recherchée, et "flânera" à travers l'Internet pour trouver un site contenant cette information, dans certaines circonstances l'utilisateur peut être entièrement au courant du site exact auquel il souhaite accéder indépendamment de l'information contenue dans ce site. Dans ce cas, le système centralisé représenté sur la figure 2a peut donner lieu à des retards non nécessaires.

Un système perfectionné selon la présente invention est représenté sous forme d'un diagramme synoptique sur la figure 2c. Brièvement, à l'intérieur du terminal client 501 lui-même, un programme serveur 502 approprié est retenu. En conséquence, le client est capable de créer un site Internet directement, le site Internet 506 étant stocké au serveur encore une fois directement au terminal 501. Le client/serveur accède alors à l'Internet 505 via une ligne ou une liaison sans fil 504. Comme cela est bien connu, il peut être accédé à l'Internet d'une manière générale par des points d'accès AP1 à APN.

En conséquence, l'invention permet à un site Internet tel qu'un site web d'être configuré au terminal sans nécessiter d'accéder à un serveur dédié, étant donné qu'un programme serveur approprié est incorporé dans le terminal client. Lorsqu'un tiers souhaite accéder au site, il doit avoir ou être capable d'obtenir des détails sur l'adresse du client serveur et peut ainsi accéder au client serveur via l'Internet.

Une implémentation particulière de l'invention survient par rapport au client/serveur réel prévu dans les terminaux mobiles, distants, communiquant avec l'Internet via un point d'accès avec lequel il est en communication sans fil. Dans ce cas, des données sont entrées à l'unité mobile, se rapportant généralement à l'environnement physique dans lequel l'unité mobile est actuellement localisée telle qu'une image de la scène environnante. Les

utilisateurs souhaitant accéder à ces données n'ont besoin que de l'adresse du client serveur. L'adresse est entrée au point d'accès approprié à l'Internet et le site est extrait directement à partir du client serveur. On verra que le client serveur peut comporter une page d'accueil qui est en réalité extraite par l'utilisateur, les sous-pages spécifiques au site étant accessibles via la page d'accueil, une fois que la page d'accueil a été atteinte.

Le système peut utiliser un terminal de données du type désigné d'une manière générale en 510 sur la figure 3a. Les éléments centraux du terminal de données 510 comprennent une caméra numérique comportant un objectif 512 et une liaison Internet sans fil 518.

Les caméras numériques sont bien connues et la structure détaillée sera évidente à l'homme de l'art si bien qu'une description détaillée n'est pas requise ici. Brièvement, cependant, la caméra numérique comporte un système d'objectif 512 pour mettre au point une image sur un réseau à CCD (semi-conducteur à couplage de charge). L'image est ainsi pixelisée et codée, par exemple sous forme d'un flot binaire. Le signal codé est décodé et affiché sur un écran d'affichage visuel 514 ou sorti en tant que sortie papier. Une image "fixe" est obtenue de la même manière mais en enregistrant une image instantanée. La majorité des composants de la caméra numérique n'est pas représentée sur la figure 3a pour des raisons de clarté. Une caméra CCD est préférable à une caméra laser étant donné que les images peuvent être enregistrées à une distance plus grande.

Le terminal de données 510 comprend de plus un clavier 516. Afin d'enregistrer une image, l'objectif 512 du terminal de données 510 est dirigé sur la scène à enregistrer. Ceci est de préférence affiché sur l'écran d'affichage visuel 514. Lorsqu'une image souhaitée est isolée, un bouton, situé par exemple sur le clavier 516, est enfoncé et une image fixe enregistrée.

Dans le mode de réalisation représenté, le terminal de données 510 comprend de plus divers composants optionnels et nécessaires. Le composant nécessaire principal est un transmetteur de signaux sans fil 518 qui, comme

décrit plus en détail ci-après, relaie l'image enregistrée vers un point d'accès distant pour diffusion à partir de ce point. Optionnellement, le terminal de données 510 comporte de plus un microphone 520 pour enregistrer, par exemple, une description verbale de la scène enregistrée, un lecteur de codes à barres 522 permettant un fonctionnement alternatif ou complémentaire du terminal de données 510, une interface physique 524 pour télécharger des informations stockées dans le terminal de données 510 vers un terminal auquel il est connecté par câble ou autre liaison et un logement de sortie d'imprimante pour délivrer une sortie papier de l'image, des informations additionnelles, ou comme décrit plus en détail ci-après, un symbole de codes à barres représentatif de l'image stockée. De plus, comme exposé ci-dessus, le terminal comporte en outre un logiciel serveur permettant la création d'un site web au niveau du terminal. Le site web peut contenir, par exemple, des images ou des sons enregistrés à partir de l'environnement du terminal conjointement avec du texte saisi au clavier et/ou les commentaires verbaux enregistrés de l'utilisateur. Une caractéristique supplémentaire qui peut être incorporée dans le terminal réside dans un système de positionnement global (GPS) d'un type connu. Le GPS communique avec des satellites GPS via une antenne appropriée (non représentée). En conséquence, la localisation géographique spécifique du dispositif mobile peut être immédiatement assurée. Ceci peut être fourni en tant que diffusion d'information additionnelle par le dispositif et peut également être utilisé par un système de pistage central pour s'assurer de l'endroit où se trouvent tous les dispositifs à un moment donné.

Une fois de plus des détails spécifiques des divers composants individuels seront évidents au lecteur expérimenté et, pour des raisons de clarté, ne seront pas répétés ici.

Afin de minimiser les coûts, l'architecture du réseau est conçue pour minimiser la quantité de trafic de données sur les liaisons de communication les plus onéreuses. Ceci peut être réalisé par exemple en sélectionnant une route de communication qui utilise les lignes disponibles les moins onéreuses. Là où

ceci peut conduire à un retard, un système de définition de priorité peut être introduit pour s'assurer que les communications pour lesquelles un retard n'est pas important puissent être envoyées sur une base à coût optimisé tandis que les signaux pour lesquels la vitesse de transmission est importante soient envoyés sur une base d'urgence. Par exemple, lorsque la communication sans fil se traduit par des coûts élevés comparativement à une communication à interfaces physiques, une information de faible priorité peut être téléchargée physiquement à partir du terminal vers un berceau pour réduire l'énergie et la charge de traitement et la charge financière générale.

Une variante de configuration de terminal peut être basée sur le mode de réalisation décrit dans la demande de brevet des Etats-Unis N° 08/691 263 déposée le 2 août 1996. Ce mémoire décrit un terminal de type modulaire comportant des modules de collecte de données interchangeables, conjointement avec une description détaillée de communications entre des unités mobiles et l'Internet.

Le système peut être utilisé pour couvrir des événements d'actualité. Un journaliste tenant le terminal peut mémoriser des images d'un événement d'actualité, et enregistrer un rapport sur l'événement. Un site web peut être instantanément défini au terminal via le serveur interne maintenant le rapport et autres données. En conséquence, un utilisateur souhaitant faire une recherche concernant l'événement d'actualité a simplement besoin d'accéder au site via le réseau. L'adresse pourrait être connue de l'utilisateur ou pourrait être disponible à partir d'un site central situé sur l'Internet décrivant où les diverses unités mobiles sont localisées et fournissant leur adresse de site. On constatera que la technologie pourrait incorporer en outre un système du type câble à péage selon lequel l'utilisateur est automatiquement facturé pour l'accès au site. On verra que beaucoup d'autres applications peuvent être envisagées. Par exemple, il est possible d'accéder effectivement à un rapport de police concernant la scène d'un accident, ou à un constat factuel d'assurance sur le lieu de l'accident plutôt que de se fier à un transfert vers un

serveur autonome pour la création d'un site web à ce niveau.

Conformément au mode de réalisation, toute forme appropriée de communication sans fil entre le client/serveur est l'Internet peut être utilisée. De tels systèmes sont bien connus pour des unités itinérantes, par lesquels des points d'accès à l'Internet disposés pour recevoir des communications à partir des unités mobiles sont localisés à des points géographiques divers. Des algorithmes connus peuvent être utilisés pour sélectionner lequel des points d'accès est le plus approprié. La communication peut elle-même se faire par les ondes radio ou par une liaison optique telle qu'un Protocole à la norme IRDA. Il sera constaté qu'un autre des avantages du système réside dans le fait que le site est stocké au terminal et nécessite seulement d'être téléchargé à la demande via la liaison sans fil réduisant ainsi les frais qui auraient été engagés par un transfert des données en continu. Les données qui ne sont jamais demandées peuvent être transférées sur une connexion moins onéreuse à un moment ultérieur.

En se référant à la figure 2d, un organigramme du fonctionnement du terminal 501 est représenté. A l'étape 5110 les données souhaitées, par exemple une image ou un enregistrement audio est capturé. Les données sont ensuite codées à l'étape 5112 dans un format approprié pour être présentées sous la forme d'une page web, par exemple en créant une image en mode point. A l'étape 5114, les données codées sont traitées pour créer une page web appropriée selon le format souhaité comme déterminé par le logiciel serveur et toute entrée de l'utilisateur. Le traitement peut alors sauter à l'étape 5116 à laquelle la page est stockée au terminal. Lorsqu'une demande d'accès à une page est reçue en 5118 par un utilisateur distant appelant l'adresse connue pour le terminal, la page est affichée au site web du terminal. Selon un système amélioré, le procédé se branche en 5114 permettant également à une adresse de page spécifique d'être créée pour les données particulières stockées dans le traitement donné à l'étape 5120. L'adresse et les détails de la page stockés à l'adresse sont affichés sur une page d'accueil à l'étape 5122.

Ceci permet la création d'un menu pour le terminal si bien que plus d'une page sont disponibles. En conséquence, lorsque le site fait l'objet d'un accès en 5124 par un utilisateur distant, ce dernier a l'option de sélectionner la sous-page pertinente affichée à la page d'accueil à l'étape 5126, d'autoriser l'affichage de toute page désirée, de retourner à l'étape 5120. Le système permet ainsi des opérations rapides et aisées sans nécessiter de programmation et en particulier sans exigence HTML (langage de description de documents hypertextuels). Une page web instantanée peut être définie en utilisant le logiciel serveur, l'image à afficher étant stockée simplement en pointant le terminal sur celle-ci et en "cliquant". Une fois de plus, le système peut être conçu avec une optimisation des coûts à l'esprit, pour s'assurer qu'une quantité minimale de trafic de données occupe les liaisons à coût élevé.

En se référant à la figure 3b, une implémentation possible d'une variante d'un mode de réalisation de la présente invention est représentée. Là où, par exemple, la police ou autre autorité, ou un inspecteur des assurances souhaite enregistrer des détails d'une scène représentée d'une manière générale en 530, l'image est capturée sous forme d'une image de caméra numérique figée par le terminal de données 510 de la manière décrite ci-dessus. L'image mémorisée est codée, par exemple sous forme d'un flot binaire et le flot binaire est transmis ou relayé via le transmetteur 518 vers un point distant.

Dans le mode de réalisation représenté, l'information d'image est relayée du transmetteur 518 vers un transmetteur 532 d'appoint intermédiaire. Ce dernier peut être soit l'un d'un réseau déployé sur une zone ou peut, par exemple, être transporté dans le véhicule de l'utilisateur du terminal de données ou un boîtier de transport. L'utilisation d'un transmetteur d'appoint 532 réduit les exigences en matière de puissance de diffusion du terminal de données 510 permettant de réserver davantage d'espace aux moyens ou accessoires de stockage/traitement de données, et l'augmentation de la durée de vie des batteries. Il sera noté que le transmetteur d'appoint est, cependant, optionnel et dans beaucoup de cas s'avère non nécessaire. La transmission

peut s'effectuer via une liaison sans fil par faisceau hertzien ou autre procédé de communication sans fil approprié. Lorsque le véhicule fait partie d'un système de pistage contrôlé GPS plus large, le dispositif de la présente invention peut être un module incorporé dans le système.

Soit le transmetteur 518 dans le terminal de données 510 soit le transmetteur d'appoint 532 relaye l'information d'image vers un point d'accès 534 comportant un récepteur pour recevoir le signal d'information relayé. Le signal reçu est entré dans un dispositif 536 processeur/stockage de données/décodeur. L'image peut alors être transférée vers tout dispositif souhaité, par exemple un dispositif de mémorisation de données central pour un accès par l'utilisateur à son retour vers ses locaux (par exemple un Intranet ou un RLE), ou un réseau d'information ou d'actualité (tel que l'Internet) sur lequel il est souhaité de diffuser l'image, ou vers une base de données de la police ou d'autres autorités sur laquelle il est souhaité d'enregistrer et de documenter l'image. Le signal transmis à partir du terminal de données 510 peut également inclure des informations telles que la destination souhaitée de l'image, des informations additionnelles concernant les circonstances, des informations codées représentatives des enregistrements de tous messages verbaux ou des enregistrements de messages sonores expliquant davantage les circonstances telles qu'enregistrées par le microphone 520. L'information concernant les circonstances, ou la destination de l'image peut être entrée via le clavier 516.

Lorsque la page web est créée sur site au terminal en utilisant un serveur interne, le système de transmission décrit ci-dessus peut également être utilisé pour un accès par des tiers à la page web.

Un diagramme synoptique représentant les composants du terminal de données 510 est illustré à la figure 4. Le terminal de données comporte diverses entrées comprenant des transducteurs appropriés pour convertir les signaux d'entrée en signaux électroniques. Les entrées comprennent l'entrée 544 de caméra numérique comportant un transducteur à réseau CCD, une

entrée de signal audio 546 comportant un transducteur de microphone et une entrée de signal de symbole de codes à barres comportant par exemple un réseau CCD. Chacun des signaux est entré dans un sous-processeur de codage ou de numérisation respectivement 550, 552, 554, et le signal traité à partir de chaque sous-processeur est transféré vers un dispositif de mémorisation et de traitement de données 556. Les données sont mémorisées, traitées et retransmises de manière appropriée vers diverses sorties. Les données se rapportant à l'image capturée par la caméra numérique 544 et, de manière appropriée, toutes données de codes à barres ou données audio sont transférées vers un module transmetteur 558 et sont transmises comme décrit ci-dessus à la sortie 560. Une sortie papier de l'image figée, ou comme décrit ci-dessous, un symbole de codes à barres représentatif de cette dernière est délivré via le module de commande d'imprimante 562 et la sortie 564. Lorsque l'on souhaite télécharger l'information mémorisée via une interface physique cela est réalisé à la sortie 566. En outre, le dispositif de mémorisation et de traitement de données 556 reçoit des informations introduites au clavier 516 via une ligne 568 et envoie l'image à partir de l'entrée de caméra numérique 544 vers l'écran d'affichage visuel 514 via la ligne 570. Le système dans son ensemble est alimenté par une source d'alimentation 572, par exemple une batterie. Lorsque le terminal est configuré pour créer une page web sur site, un serveur peut être incorporé dans l'équipement matériel (ou logiciel ou une combinaison d'équipement matériel et logiciel) comme représenté en 557.

En conséquence, il sera constaté que selon un aspect les données d'images peuvent être capturées automatiquement et transmises vers une base de données commune accessible aux utilisateurs autorisés. Les images pourraient être transportées et/ou faire l'objet d'un accès via des serveurs vidéo, des logiciels de groupes de travail collaboratifs et des multimédia distribués, et mises en oeuvre par la téléconférence vidéo de bureau. Le traitement de l'image peut être effectué sur les données brutes une fois qu'elles ont été transmises au réseau principal, permettant une réduction

supplémentaire des exigences de traitement et par conséquent des exigences en matière d'énergie et d'espace pour le terminal de données lui-même.

Un avantage particulier de l'utilisation d'une caméra numérique réside dans le fait que l'image peut être mémorisée à une résolution élevée à moyenne et transmise électroniquement avec un minimum de traitement intermédiaire.

Il sera constaté qu'une large gamme d'applications est disponible, en particulier en ce qui concerne les industries dans lesquelles généralement des images photographiques (numériques) sont régulièrement prises sur le terrain. Une variante à l'application de documentation de déclaration d'assurance décrite ci-dessus, lorsque des offres/devis sont impliqués, l'article pour lequel l'offre/devis est fourni, la documentation par exemple du travail requis sur la base duquel l'offre ou le devis a été établi peut être enregistrée. De manière similaire, lorsqu'un travail de réparation ou un travail d'amélioration a été envisagé, une évaluation peut être effectuée en prenant en compte les images mémorisées. Le système peut être utilisé en tant qu'aide générale à la documentation d'articles ou de circonstances. Comme exposé ci-dessus, le système pourrait être implémenté en application de la loi. Par exemple, la scène d'un crime ou d'un accident peut être mémorisée et retransmise ou consultée. En fait, des criminels pourraient être photographiés et l'image comparée à une base de données appropriée à des fins d'identification en utilisant des techniques de comparaison d'images connues. Ce système peut également être utilisé en tant qu'aide préliminaire à une documentation plus exhaustive de circonstances telle que des épreuves et/ou des bouts d'essai. Les données sont de préférence retransmises telles que déterminées par une architecture de réseau conçue pour réduire les coûts de transmission en minimisant les transmissions sur les liaisons de communication à coût élevé.

Comme on peut le voir pour toutes les applications possibles mentionnées ci-dessus et toutes les autres applications, le système comporte des avantages particuliers et importants, en particulier en fournissant un accès

immédiat aux images à des tiers contractants du réseau de distribution d'images, en fournissant l'accès à tous les utilisateurs simultanément comme souhaité, en expédiant la durée de traitement (consécutivement à l'accès immédiat), en améliorant la précision et/ou l'efficacité, de par la disponibilité d'information plus précise en particulier dans des implémentations à résolution élevée, et des économies financières associées résultant en particulier de la durée de traitement réduite et de la précision améliorée.

Une autre encore des implémentations possibles du dispositif pourrait se présenter sous la forme d'une alarme d'incendie ou d'un détecteur de fumée distant. Un terminal comportant les composants de base d'une caméra numérique ou autre moyen d'enregistrement d'images et présentant une connexité de réseau peut être monté à demeure ou de manière amovible dans une zone dans laquelle il est souhaité de contrôler le feu, la fumée, des gaz toxiques et autres dangers de ce type. Le terminal comporte de plus un détecteur de danger de tous types appropriés tels qu'un détecteur de fumée, un détecteur de chaleur, un détecteur de substances nocives ou autres. Tous ces détecteurs sont bien connus de l'homme de l'art et ne nécessitent pas une description supplémentaire ici. Dans le cas, par exemple, d'un terminal d'alarme d'incendie, lorsqu'un détecteur de chaleur détecte que la température ambiante s'est élevée au-dessus d'une limite prédéfinie, le terminal est activé pour capturer une image figée ou animée de la scène. Au même moment, le terminal informe les autorités compétentes telles que les pompiers et l'image est transmise d'une manière décrite ci-dessus vers un point d'accès au poste de pompiers. En conséquence, la scène peut être examinée et il peut être affirmé qu'un risque d'incendie véritable existe ou qu'une autre activité à laquelle l'augmentation de la température est imputable peut être détectée telle qu'une activité de cuisson. En conséquence, de fausses alertes peuvent être évitées dans une large mesure. On verra qu'une approche similaire peut être adoptée pour d'autres détecteurs de danger, lorsqu'une image de la scène est transmise vers les autorités appropriés lorsqu'un risque potentiel est d'abord

détecté pour une confirmation supplémentaire avant une mobilisation complète.

Une autre implémentation pour laquelle le système de la présente invention selon un autre aspect serait particulièrement approprié et qui profiterait des avantages mentionnés ci-dessus réside dans le domaine du transfert de marchandises, par exemple la livraison de colis. Lorsqu'un colis endommagé est reçu il n'y a pas moyen de savoir immédiatement l'état du colis lorsqu'il a été expédié. Le système de la présente invention serait, cependant, en mesure d'acquérir l'image et de la transmettre vers un emplacement distant où de créer une page web appropriée sur site. L'image pourrait ensuite être consultée au dépôt récepteur et comparée avec le colis réel reçu pour établir si l'état a changé d'une manière quelconque. Une option alternative serait d'imprimer l'information d'image dans un format de codes à barres, le code à barres lui-même étant attaché au colis lui-même. Le symbole de codes à barres pourrait être décodé au dépôt récepteur, une fois de plus pour comparer l'image avec le colis reçu. Evidemment, un symbole de codes à barres à résolution élevée sera nécessaire, par exemple au protocole PDF 417. Le lecteur représenté sur la figure 3a comporte la capacité pour un tel dispositif comportant une imprimante et un emplacement ou logement d'imprimante 526.

On pourra noter que les modes de réalisation décrits ci-dessus se rapportent à une implémentation spécifique possible de l'invention, et que l'invention englobe un grand nombre de variantes. Par exemple, tel que représenté sur la figure 5, le terminal de données 510 est configuré avec des considérations ergonomiques à l'esprit, s'ajustant confortablement dans la paume de la main de l'utilisateur. En conséquence, le terminal de données 510 peut être rapidement et précisément dirigé vers une image à enregistrer, en utilisant l'écran d'affichage visuel pour s'assurer que l'image est telle que souhaitée. Au même moment, le clavier peut être manipulé confortablement en utilisant l'autre main de l'utilisateur pour capturer l'image, entrer des informations supplémentaires, etc. En variante, le terminal peut être sous la forme d'une caméra classique, ou d'une caméra vidéo, ou toute autre

configuration appropriée permettant la capture d'image, et, de préférence, l'entrée de données.

La caméra numérique comporte de préférence des fonctionnalités autofocus et des fonctionnalités de zoom manuel avec un bouton/déclencheur séparé pour le zooming ou agrandissement, lequel bouton/déclencheur peut faire partie intégrante du clavier ou bien peut être fourni séparément. La caractéristique de zoom manuel sera une aide dans la prise de gros plans du sujet à représenter. Comme mentionné ci-dessus, une imprimante, par exemple une imprimante de bas de gamme à faible densité peut être incorporée dans le terminal de données, ou fournie en tant qu'adjuvant, si bien qu'une copie papier de l'image est disponible sur le terrain. Comme également décrit ci-dessus, l'image pourrait être imprimée dans le format PDF 417 pour un décodage subséquent.

La figure 8 représente une variante de configuration pour un terminal de données. Le terminal 510 contient généralement tous les composants mentionnés à propos des autres modes de réalisation ci-inclus. Cependant, le terminal 510 est configuré selon un modèle "pointé et tiré" et comporte une partie crosse 5120 et une partie barillet 5122. La partie crosse est configurée pour reposer de manière confortable et aisée, avec un équilibre optimal, dans la main de l'utilisateur et porte de plus un déclencheur ou détente 5124 et une mollette 5126. Un écran d'affichage 5128 et un clavier optionnel 5130 sont prévus sur la surface supérieure de la partie barillet 5122 pour permettre une visualisation aisée et un accès d'entrée à l'utilisateur. L'objectif de la caméra ou autre moyen d'enregistrement d'image est prévu sur la face avant de la partie barillet 5122 (non représentée) permettant à l'utilisateur de pointer simplement le terminal 510 dans la direction qu'il est souhaité d'enregistrer. Lorsque la scène souhaitée est visualisée sur l'écran 5128, la capture est effectuée par actionnement du déclencheur 5124. Le zoom peut être contrôlé par la mollette 5126 qui est de préférence localisée pour une facilité optimale d'utilisation par le pouce de l'utilisateur lorsque la partie crosse 5120 est tenue par l'utilisateur.

La vitesse de traitement et les capacités de stockage des composants du terminal de données peuvent évidemment être déterminées selon le coût final du système, par exemple un microprocesseur plus lent et par conséquent meilleur marché peut être incorporé. Pour des applications plus haut de gamme, le terminal de données pourrait de plus inclure une carte SRAM (mémoire vive statique) pour mémoriser les images figées. En outre, l'écran d'affichage visuel 514 peut, comme représenté sur la figure 6, comporter des capacités LCD (affichage à cristaux liquides). En conséquence, en utilisant un stylet approprié 100, l'image peut être modifiée par exemple en entourant ou autrement mettre en valeur des zones offrant un intérêt, les modifications étant représentées sur l'écran LCD en 5102 sur la figure 6. Les modifications peuvent être supprimées ou révisées davantage en utilisant le clavier de manière appropriée.

La gamme des implémentations, et la vitesse et l'efficacité du système peuvent être améliorées davantage en incorporant également des capacités de lecteur de codes à barres dans, ou en conjonction avec, le terminal de données. La construction et les applications des lecteurs de codes à barres seront bien connues de l'homme de l'art et ne nécessitent pas une description détaillée ici. Brièvement, cependant, un symbole de codes à barres comprend une ou plus d'une rangée de régions claires et obscures, typiquement sous la forme de rectangles ou, dans le cas des codes à deux dimensions, sous la forme d'une matrice bidimensionnelle d'espaces clairs et obscurs. Les dimensions des régions obscures et claires indiquent l'information codée destinée à être lue. Un lecteur de symbole de codes à barres illumine le symbole en utilisant des moyens de génération de faisceaux de lecture et détecte la lumière réfléchie sur les régions codées en utilisant des moyens de détection de faisceaux de lecture pour détecter les dimensions des régions codées. Un décodeur décode l'information codée détectée. Des symboles connus comporteront, par exemple, des codes UPC (code produit universel)/EAN (numérotation d'articles européenne), Coder 128, Codabar et

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Un type connu de lecteur de codes à barres consiste dans un lecteur wand de données tel que décrit dans le brevet des Etats-Unis d'Amérique N° 4 471 218 cité ici à titre de référence.

La figure 7 montre un terminal de données 510 du type décrit ci-dessus incorporant de plus un lecteur optique 5110 intégré au terminal de données 510. Le lecteur 5110 comporte des moyens de génération et de détection de faisceaux de lecture et le terminal de données 510 comporte des moyens de traitement pour décoder l'information codée détectée. Le lecteur 5110 peut comprendre soit un scanneur laser à "spot mobile" comportant des moyens pour scanneur le faisceau de lecture ou un lecteur optique à "champ de vue" incorporant un réseau CCD en tant que détecteur. Les deux types de lecteurs sont bien connus du lecteur expérimenté et une description complète des composants et du fonctionnement n'est pas fournie ici.

On notera qu'une large gamme d'implémentations peut être envisagée pour le terminal de données 510 représenté sur la figure 7. En particulier, il peut être utile dans beaucoup de circonstances de pouvoir lire l'information codée sous forme de codes à barres pour offrir des informations additionnelles à celles récupérées par le terminal de données à partir de l'environnement externe.

Un mode de réalisation particulièrement avantageux est représenté sur la figure 7. En particulier, un livre ou autre matériau imprimé 5114 est prévu, lequel peut être porté par l'utilisateur et comporte des codes à barres imprimés 5116 qui sont lus par le lecteur 5110 et l'information contenue est utilisée par le terminal de données 510. Comme décrit plus en détail ci-après, le terminal de données 510 comprend en fait un serveur Internet capable de créer un site web au niveau du terminal de données portant, par exemple, des informations concernant l'environnement externe situé autour du terminal de données pour un accès par des utilisateurs se trouvant à d'autres endroits sur l'Internet. Dans de telles circonstances, le terminal pourrait de manière classique souhaiter de

télécharger du code exécutable à partir d'une machine hôte en utilisant un langage d'implémentation d'agent tel que Java (marque commerciale). Ce système peut être encombrant et consommateur de temps du fait du niveau des communications requises entre le client et l'hôte. La présente invention résout ce problème en stockant le code exécutable (applets ou appliquettes) sous la forme de codes à barres à haute densité à deux dimensions 5116 dans le livre 5114. Chaque symbole 5116 de codes à barres est identifié par un titre court approprié ou autre information d'identification dans le livre. Lorsqu'il est nécessaire d'accéder à une appliquette, l'utilisateur est simplement invité à lire le code à barres à deux dimensions en utilisant le lecteur de codes à barres 5110, et le code exécutable est immédiatement téléchargé vers le terminal de données 510 pour que ce dernier l'utilise de la manière appropriée.

L'invention permet à l'utilisateur de porter un livre usuel - par exemple ayant 500 pages de codes d'appliquettes à deux dimensions. Un tel livre ne serait pas encombrant et serait en réalité attractif aux yeux de beaucoup d'utilisateurs. Le système permet un téléchargement considérablement accéléré d'appliquettes en un temps aussi bref que quinze secondes. Les systèmes de téléchargement classique seraient encore en train d'attendre la connexion à l'hôte dans cette plage d'échelle de temps.

On appréciera le fait que tout code exécutable approprié peut être mémorisé dans un langage souhaité dans les codes à barres à deux dimensions 5116. Une large gamme d'appliquettes différentes peut être évidemment stockée conformément à ce système et indexée de manière appropriée. En fait, le système pourrait être utilisé pour des clients fixes ou dédiés aussi bien que pour le terminal de données clients mobile distant représenté sur la figure 7.

On verra que le terminal de données peut communiquer avec tout réseau de données approprié, par exemple un point d'accès à l'Internet, ou à un système dédié fermé concernant l'utilisateur ou auquel l'utilisation s'abonne avec d'autres utilisateurs. La communication peut s'établir au moyen d'une

communication radiofréquence ou, si cela s'avère approprié, une communication par infrarouge ou par faisceaux hertziens, ou tout autre procédé de communication sans fil approprié.

On appréciera le fait que l'une quelconque des caractéristiques décrites à propos d'un mode de réalisation peut, lorsqu'appropriée, être incorporée dans tout autre mode de réalisation sans s'écarter de l'enseignement du présent mémoire descriptif.

Tel qu'utilisé dans le présent mémoire et les revendications annexées, le terme "indices" inclut globalement, non seulement des motifs de symbole composés de barres et d'espaces alternés de diverses largeurs communément appelés des symboles de codes à barres, mais également d'autres motifs graphiques à une ou deux dimensions, de même que des caractères alphanumériques. En général, le terme "indices" peut s'appliquer à tous types de motifs ou d'informations qui peuvent être reconnus ou identifiés par scannage à l'aide d'un faisceau lumineux et détection de la lumière réfléchie ou diffusée sous forme d'une représentation des variations du pouvoir de réflexion lumineuse en divers points du motif ou de l'information. Un symbole de codes à barres est un exemple d'un "indice" que la présente invention peut scanneur.

Un mode de réalisation d'un lecteur optique destiné à être utilisé conjointement avec la présente invention est représenté sur la figure 22. Bien qu'un lecteur optique du type à stylet (souvent connu sous la dénomination "wand de données") sont représenté, on appréciera le fait que toute autre configuration qui tient dans la main pourrait être appropriée pour l'utilisation en conjonction avec la présente invention. Bien que des détails de construction spécifique soient également décrits plus en détail ci-après, on notera que les éléments de stockage/traitement de données et les éléments de lecture optique de type connu peuvent remplacer les composants spécifiques décrits, d'une manière qui sera bien connue de l'homme de l'art. Une description des lecteurs de type à stylet peut être trouvée dans le brevet des Etats-Unis d'Amérique N° 5 506 392 dont la Demanderesse est titulaire et qui est cité ici à titre de

référence.

Le lecteur optique du type à stylet (auquel on se référera désormais sous la dénomination "lecteur wand") est désigné d'une manière générale par la référence 690 sur la figure 22. On notera que la forme exacte du lecteur wand telle que montrée en 690 peut être exagérée, par exemple en largeur, afin de montrer plus clairement chacun des composants principaux et la manière dont ils interagissent. Dans le mode de réalisation représenté, le lecteur wand 690 comprend un stylo à bille 691, 692, de même que le lecteur optique 693 lui-même. Le lecteur wand ne nécessite pas réellement de posséder une capacité d'écriture, ou peut être sous la forme de tout instrument d'écriture approprié, tel qu'un crayon, un stylo à encre, un stylo marqueur, etc. En fait, le sous-système de lecteur optique décrit plus en détail ci-après, peut être dans une forme modulaire pouvant être introduite dans une enveloppe d'instrument d'écriture configurée de manière appropriée de tout type désiré.

L'élément d'écriture de lecteur wand 690 est représenté de manière schématique sous la forme d'une cartouche 691 de stylo à bille conjointement avec un mécanisme de projection/rétraction désigné d'une manière générale par la référence 692 et appartenant à tout type connu approprié. Evidemment, il est souhaitable de réduire autant que possible la taille de ces éléments 691, 692 pour réserver un maximum d'espace au module lecteur.

Le module lecteur est désigné d'une manière générale par 693. Les composants et la construction du module 693 seront d'une manière générale bien connus de l'homme de l'art et ne sont décrits que brièvement ci-après à des fins d'exhaustivité. Le module lecteur 693 comporte une source lumineuse 694, par exemple, un laser ou une LED (diode électroluminescente) et un réflecteur 695. Un faisceau de lecture généré par la source lumineuse 694 est réfléchi par le réflecteur 695 hors d'une fenêtre de lecture 696. Le faisceau de lecture est réfléchi par un symbole de codes à barres désigné de manière générale en 697 passe une fois de plus à travers la fenêtre de lecture 696 et est reçu par un détecteur 698. De préférence, le module lecteur 693 est un

lecteur à champ de vue auquel cas le miroir 695 est un miroir fixe et le détecteur 698 comprend un réseau CCD (semi-conducteur à couplage de charge). Evidemment, dans certaines implémentations un système de scannage peut être utilisé auquel cas le réflecteur 695 est entraîné par un moteur représenté schématiquement en 699 pour un déplacement de scannage. La source lumineuse 694, le détecteur 695 et, si approprié, le moteur 699 sont reliés à un élément 6100 processeur, de contrôle et de stockage de données en liaison avec une source d'alimentation 6101. L'élément processeur 6100 contrôle le fonctionnement des divers composants et agit également en tant que dispositif de stockage et de traitement de données pour les informations de codes à barres lues par le module 693. Comme décrit plus en détail ci-après, il est souhaité de télécharger l'information mémorisée dans l'élément processeur 6100 à un stade ultérieur vers un dispositif externe. En conséquence, un port de sortie de données 6103 est prévu alimenté par la ligne 6102, de préférence au voisinage ou en liaison avec la fenêtre de lecture 696. Le lecteur wand 690 peut également être utilisé comme pointeur laser dans un mode de réalisation, dans lequel le faisceau de lecture de sortie est utilisé pour mettre en valeur des éléments souhaités pendant une présentation.

Une implémentation particulière proposée conformément à la présente invention, pour le lecteur wand 690 s'applique à propos de l'accès à l'information par le consommateur tel que représenté sur la figure 23a. Par exemple, lorsqu'un consommateur 6120 porte un lecteur wand 690 et qu'il se trouve dans un point de vente au détail proposant des produits 6121, chacun de ces produits peut porter un symbole de codes à barres 6122 par exemple dans le format UPC (code produit universel). Le consommateur 6120 peut être intéressé par l'achat du produit 6121 mais peut ne pas être prêt à passer à l'acte jusqu'à ce que des informations supplémentaires soient disponibles. Il existe, par conséquent, un risque que le consommateur oublie le produit ou, comme précédemment, il peut être nécessaire de compter sur un

consommateur 6120 trouvant par hasard le produit ou des informations additionnelles concernant le produit, et le fait que sa mémoire soit rafraîchie en conséquence.

Selon la présente invention, cependant, le consommateur 6120 peut lire le symbole de codes à barres 6122 en utilisant le lecteur wand 690. L'information de codes à barres est stockée dans l'élément processeur 6100 et, dans la mesure souhaitée, traitée. En particulier, l'information contenue dans le symbole de codes à barres 6122 concernant le produit 6121 est stockée. En conséquence, le consommateur bénéficie d'un rappel automatique du produit qu'il souhaite acheter de même que de l'information concernant le produit. Evidemment, lorsque le consommateur 6120 aperçoit plus d'un produit offrant un intérêt, l'information pertinente peut être également stockée, les capacités de stockage du lecteur wand 690 étant limitées uniquement par l'espace de stockage dans l'élément processeur 6100.

Une implémentation particulière de la présente invention permet au consommateur de télécharger subséquemment l'information stockée dans le lecteur wand 690 d'une manière décrite plus en détail ci-après. En particulier, l'information peut être téléchargée vers un ordinateur individuel ou autre point d'accès à un ordinateur ou à un réseau de données. L'information téléchargée peut alors être utilisée de diverses manières différentes. Par exemple, le produit peut être commandé ou des informations additionnelles concernant le produit peuvent être consultées. Une implémentation particulière proposée dans la présente invention réside dans le fait que le symbole de codes à barres accompagnant le produit contient suffisamment d'informations pour l'ordinateur individuel ou le point d'accès au réseau informatique afin d'accéder à un site sur l'annonce publicitaire (ou système de mémorisation de données comparable). Ce site peut contenir des informations additionnelles concernant le produit, des informations concernant des produits apparentés, des informations de prix, des références croisées vers d'autres sites apparentés, et la capacité de commander et de payer le produit. Ceci simplifie grandement le

processus d'achat, permettant par exemple un contrôle du prix et assurant également que le consommateur n'oublie pas un produit qui a attiré son attention.

De plus, des informations supplémentaires peuvent être dérivées conformément à la présente invention. Par exemple, la popularité d'un produit peut être évaluée pour des études de marché futures. De préférence, le lecteur wand 690 a un utilisateur dédié et porte des informations d'identification de l'utilisateur telles qu'un numéro de carte de crédit, ou autre identification portée par un système autorisé. En conséquence, pendant l'achat du produit des détails de la transaction peuvent être basés sur cette information. De plus, un profil de consommateur peut être établi sur la base des schémas d'achat du consommateur.

Le point d'accès peut être localisé à l'intérieur du point de vente au détail permettant au consommateur 6120 d'accéder à l'information sur site et réaliser une décision d'achat avant de quitter le point de vente au détail. Des points d'accès appropriés sont décrits plus en détail ci-après. On verra que le symbole de codes à barres peut être apposé sur le produit, ou comme représenté en 6123 sur l'étagère au voisinage du produit. En variante, les produits pourraient être affichés graphiquement sur un tableau et les symboles de codes à barres représentés sur ou au voisinage du produit sur le tableau.

On verra que le système peut être étendu à d'autres applications. Par exemple, lorsqu'un abrégé de texte est imprimé conjointement au symbole de codes à barres, le symbole de codes à barres peut contenir des informations qui, lorsque téléchargées, peuvent fournir l'accès au texte additionnel ou apparenté. Sous réserve d'une résolution suffisamment élevée, le symbole de codes à barres peut être même lu via un VDU (unité à affichage vidéo) ou autre système d'affichage visuel dans un système fermé afin d'accéder à des informations additionnelles sur l'Internet. Le symbole de codes à barres peut se conformer à tout protocole approprié, par UPC (Universal Product Code) ou EAN (Europan Article Numbering ou numérotation d'articles européenne) et est

traduisible en adresse uniformisée de ressource Internet (URL).

Une autre application du système est décrite en se référant à la figure 23b. Un catalogue 6278 qui montre un produit 6294 et contient également diverses données concernant le numéro de l'article 6282, la quantité 6284, la couleur 6286, la taille 6288 et autre information 6290. En outre, des informations d'expédition codées avec des codes à barres sont mémorisées en 6292 et le mode de paiement en 6293. Un tel catalogue est destiné à l'utilisation, par exemple, dans des applications de téléachat. Le catalogue peut également porter un code à barres identifiant l'appelant en 6280, information qui peut être utilisée pour l'identification du consommateur au stade de l'achat. L'implémentation particulière conforme à la présente invention nécessite que l'information produit téléchargeable appropriée soit stockée dans les symboles de codes à barres. En particulier, le numéro de l'article 6282 peut en fait être sous la forme d'une adresse de site de réseau information appropriée. En variante, l'adresse de site de réseau information peut être mémorisée dans l'autre champ d'information 6290. Les symboles de codes à barres restants peuvent ne pas être requis, étant donné que l'information peut être stockée à l'adresse du site, mais le mode de réalisation représenté permet des variantes d'implémentation en fonction de l'équipement matériel disponible à l'utilisateur.

L'utilisateur parcourt avec le lecteur wand le champ d'adresse de site et, si nécessaire le champ d'identité utilisateur 6280 et télécharge l'information stockée vers un point d'accès à l'Internet (ou autre réseau informatique). L'information produit restante est disponible au site Internet et les options telles que la quantité, la couleur, la taille, la méthode d'expédition et le mode de paiement peuvent être introduites à ce stade. En conséquence, un système de téléachat basé sur catalogue simple peut être mis en place. On appréciera le fait qu'un tel système peut être introduit dans divers environnements, par exemple lorsqu'un passager est dans un avion, un catalogue approprié peut être fourni. Une fois encore, le système permet au consommateur d'examiner soigneusement quels produits il souhaite acheter sur la base de toutes les

informations disponibles, et fournit également une invite ou un rappel utile concernant les produits qui ont attiré l'œil du consommateur et sur lesquels le consommateur n'est pas encore décidé.

Lorsque le symbole de codes à barres est destiné à être utilisé conjointement avec le système a ou un système parallèle, l'information contenue dans le symbole de codes à barre comprend effectivement une adresse. Lorsque cette information est téléchargée vers un ordinateur individuel, l'ordinateur individuel communique avec un serveur dédié qui capture l'adresse a et les informations d'identification de l'utilisateur et re-dirige vers le site d'informations produit approprié, par exemple un site web pour la recherche d'informations de cette dernière sur l'ordinateur individuel du consommateur. En conséquence, l'information téléchargée pourrait permettre au PC (ordinateur individuel) d'aller directement vers une page d'accueil appropriée ou une sous-page appropriée. Un serveur de résolution situé sur le système pourrait être utilisé pour collecter des informations à partir de tous les utilisateurs, non seulement à des fins d'information mais également à des fins de facturation et de routage.

On reconnaîtra que des systèmes constituant des alternatives à l'Internet, et des méthodes d'accès alternatives sont envisagées. Par exemple, l'Internet pourrait être remplacé par un Intranet ou un réseau local d'entreprise (RLE), accessible par un nombre limité d'utilisateurs avec une restriction soit géographique soit par quelque forme d'autorisation d'accès. Au lieu d'être téléchargeable vers un PC qui traite l'information d'adresse de site, ouvre le site autorisé et affiche l'information produit, d'autres points d'accès sont envisagés. Par exemple, suivant un système tel que le système Citrix (marque commerciale), le téléchargement pourrait être simplement un point d'accès ou terminal avec un minimum de capacité de traitement lui-même. Le terminal transfère l'information d'adresse de site vers un ordinateur hôte qui effectue la conversion principale vers une URL, accède au site web et retourne l'information vers le terminal pour affichage. Dans ce cas le terminal agit

légèrement plus qu'un dispositif d'affichage et d'entrée/sortie. Il est à envisager, par conséquent, que le système pourrait englober la nouvelle génération des "ordinateurs réseau" (network computers) également appelés "terminaux de réseaux" travaillant sur ce principe. L'effet d'un tel système est une modification considérable dans l'architecture du système permettant des coûts réduits au consommateur qui n'a besoin d'acheter que le terminal de bas de gamme pour se connecter à un ordinateur hôte relié au réseau principal. En conséquence, l'invention proposée est encore plus souhaitable et accessible au consommateur.

Diverses variantes de configurations du lecteur wand sont représentées sur les figures 24 à 26. En se référant tout d'abord aux figures 24a et 24b, un lecteur wand 6130 comporte un ensemble stylet 6132 comprenant une cartouche de stylos à bille, par exemple du type vendu sous la dénomination commerciale Zebra F-refill et un mécanisme d'actionnement 6134 d'un type connu pouvant pivoter pour déployer et rétracter la cartouche de stylo à bille. Le lecteur wand 6130 comprend de plus un déclencheur 6136 pouvant être actionné manuellement pour autoriser un balayage avec un interrupteur interne de coopération 6138 sous, par exemple, le code ITT KSC 421. Le lecteur wand 6130 comporte une pointe wand 6140 pour lire un symbole de codes à barres. Un point de sortie de données est également prévu en 6137. Le système est alimenté par une batterie 6142 de n'importe quel type compact approprié. Egalement inclus dans le système, on trouve un "beeper" ou avertisseur 6144 ou autre dispositif audible qui peut sonner pour indiquer à l'utilisateur qu'un symbole de codes à barres a été lu avec succès, que l'alimentation est faible, qu'il reste peu d'espace mémoire, etc. Différentes tonalités audibles ou séquences de tonalités audibles peuvent représenter différents signaux d'avertissement. De plus, le lecteur wand 6130 peut inclure un écran (non représenté) portant l'information concernant l'état du lecteur wand et toutes instructions pour l'utilisation de ce dernier.

Les figures 25a à 25c montrent une légère variante dans laquelle,

lorsqu'approprié, on a utilisé les mêmes références numériques que celles de la figure 24. On verra que la fenêtre de sortie pour le lecteur (représenté ici comme un scanneur à laser en 6131) se trouve dans une face inclinée par rapport à l'axe longitudinal du lecteur wand 6130, permettant une ergonomie améliorée pour la lecture d'un symbole de codes à barres. Le lecteur comporte de plus une bande de prise 6133, réalisée par exemple en cuir, autour d'un tronçon de sa longueur permettant une prise par l'utilisateur et un confort amélioré.

Les figures 26a et 26b montrent schématiquement une autre variante de configuration utilisant une fois de plus les mêmes références numériques lorsqu'approprié que sur les figures 24 et 25. Diverses méthodes de téléchargement de l'information sont envisagées. Deux approches sont représentées sur les figures 27a et 27b. Dans une configuration préférée représentée sur la figure 27a, il est montré un ordinateur individuel en 6150 de type portable bien qu'un PC de type fixe soit, évidemment, également suffisant. L'ordinateur individuel 6150 comporte un clavier 6152 et un écran 6154 et peut d'une manière générale être de type classique. L'ordinateur individuel 6150 comporte un port d'entrée de données 6156 agencé pour communiquer avec le port de sortie de données du lecteur wand 6103. Dans le mode de réalisation représenté, le port de sortie 6103 du lecteur wand 690 est amené en contact de toucher contre le port d'entrée de données 6158 de l'ordinateur individuel 6150. Le fait de toucher le port d'entrée 6156 déclenche en premier lieu la séquence de téléchargement et en second lieu permet une communication précise et rapide entre le lecteur wand 690 et l'ordinateur individuel 6150. L'interface entre le point de sortie 6103 du lecteur wand 690 et le port d'entrée de données 6156 peut, par exemple, être du type "bouton à mémoire" ou "mémoire à touche" comme celui commercialisé par exemple par la Société Dallas Semiconductors. L'interface réelle est de type bien connu et en fait l'information stockée dans le lecteur wand 690 est communiquée à un bouton à mémoire 6103 prévu à un point approprié du lecteur wand 690. L'information est convertie en une forme

appropriée pour transmission au niveau du bouton à mémoire 6103 et, sur contact avec le port d'entrée de données 6156 de l'ordinateur individuel 6150, la transmission est activée. Le port d'entrée de données 6156 est configuré pour recevoir l'information transférée à partir du bouton à mémoire 103 et convertir cette dernière en une forme appropriée. En particulier, l'information peut être transférée sous la forme d'une série de bits représentant des impulsions électroniques. Un tel système conduit à une interface simple et pratiquement exempte d'erreurs permettant à un utilisateur de télécharger l'information stockée dans un lecteur wand 690 vers un ordinateur individuel 6160 de manière rapide et précise.

Comme on pourra l'apprécier, diverses autres méthodes de téléchargement sont envisagées dans le champ d'application de la présente invention. Par exemple, comme représenté sur la figure 27b, un ordinateur individuel 6160 de type fixe comportant un clavier 6162, un écran d'affichage 6163 et une souris 6164 comporte un microphone 6166 qui reçoit un signal audio à partir d'une sortie de données de haut-parleur correspondante 6168 sur un lecteur wand 690. Un bouton (non représenté) ou autre commutateur peut être incorporé dans le lecteur wand 690 pour activer la transition par le haut-parleur 6168. L'information stockée dans le lecteur wand 690 est convertie en un signal audio à haute fréquence au niveau du haut-parleur 6168, lequel signal est reçu par le microphone 6166 et est décodé. Bien entendu, le transmetteur peut transmettre d'autres formes de radiation, par exemple, il peut s'agir d'un transmetteur optique ou à faisceau hertzien, un récepteur approprié étant prévu sur l'ordinateur individuel.

Lorsque le transmetteur est à base optique, il peut utiliser une implémentation de communications à la norme IRDA (infrarouge) comme cela est bien connu de l'homme de l'art et communément disponible sur beaucoup d'ordinateurs portatifs. La transmission optique peut être à la fréquence de clignotements (répétitions) de la source d'illumination du stylet.

Un système de téléchargement encore différent est représenté sur la

figure 28. Un port de téléchargement de données dédié 6170 comporte un orifice 6172 pour recevoir un lecteur wand 690. Le port 6170 communique des informations téléchargées à partir du lecteur wand 690 via une ligne 6174. En se référant à la vue en coupe représentée sur la figure 29, on peut voir que le port 6170 comporte une interface de réception de données 6174 de l'un quelconque des types décrits ci-dessus, qui communique avec le lecteur wand 690 pour le téléchargement de l'information. Le téléchargement peut être activé par contact par mise en contact du lecteur wand 690 et de l'interface 6174 ou activé en poussant un bouton ou autre commutateur (non représenté) sur le lecteur wand. L'interface 6174 communique avec un processeur 6176 pour convertir l'information téléchargée si nécessaire en un format approprié pour un réseau informatique, et l'information est communiquée au réseau informatique via une ligne 6173.

On appréciera le fait que la ligne 6173 peut comprendre une liaison sans fil ou une liaison téléphonique, auquel cas un modem approprié peut être intégré au port 6170.

On peut voir que toutes ces méthodes comprennent un système convivial pour télécharger des informations scannées à partir d'un lecteur wand. L'utilisation d'un port du type puits de données du type représenté sur les figures 28 et 29 est particulièrement appropriée lorsqu'il n'est pas souhaité de se reposer sur le consommateur possédant un PC ou autre accès domestique à un réseau informatique approprié. Le port peut par exemple être prévu dans un dépôt de vente au détail ou autre point de vente. Il faut noter que le lecteur wand peut également être inscriptible via le port de données, l'ordinateur individuel ou autre moyen (même le symbole de codes à barres lui-même) pour entrer des informations utilisateurs du type décrit ci-dessus. Ceci peut faciliter un usage à court terme d'un lecteur wand permettant à un utilisateur donné d'entrer des informations de manière temporaire pendant la durée de son utilisation du lecteur wand.

Dans une variante de réalisation ergonomique, le lecteur comporte les

composants décrits d'une manière générale ci-dessus mais est d'une configuration légèrement différente. En se référant aux figures 30a et 30b, le lecteur 6200 a à peu près la taille d'un stylo classique mais, en section transversale par rapport à son axe longitudinal, est d'une forme sensiblement rectangulaire. De plus, une fenêtre de scannage 6202 est prévue à peu près à l'extrémité supérieure de l'une des faces latérales plutôt qu'à la pointe elle-même. En se référant à la figure 30b, on peut voir qu'une variante de configurations de lecture est ainsi réalisée de manière que le lecteur 6200 soit tenu de manière sensiblement parallèle, plutôt que sensiblement perpendiculaire, à une page 6204 destinée à être lue. De préférence dans ce mode de réalisation, une fenêtre d'affichage 6206 et un déclencheur marche/arrêt 6208 sont prévus à peu près à l'extrémité supérieure de la face latérale opposée. En conséquence, le déclencheur 6208 peut être contrôlé, par exemple, par le pouce de l'utilisateur, avec une aisance optimale pour une lecture ergonomique. De manière similaire, l'afficheur 6206 peut être aisément lu par l'utilisateur. Evidemment, une disposition de clavier et/ou d'afficheur plus complexe peut être incorporée comme approprié.

La figure 30c représente une coupe partielle des détails internes d'un lecteur tel que celui représenté sur la figure 30a et 30b. On peut voir que l'agencement représenté sur la figure 31 comporte une extrémité avant arrondie. En pratique, cet agencement peut en fait être circulaire ou rectangulaire en section transversale comme représenté sur les figures 30a et 30b. On notera que l'agencement représenté n'est pas nécessairement à l'échelle. A l'extrémité arrière 6210 du lecteur 6200, une ou plusieurs cellules d'alimentation 6212 sont prévues et maintenues en place par des moyens appropriés tels qu'un bouchon fileté 6214. Montés sur une carte 6216 pour la facilité d'assemblage, se trouvent les principaux composants lecteurs dont une diode laser 6218 et un miroir de lecture 6220. Le miroir de lecture peut être entraîné en mouvement de scannage par un pilote de scanneur 6222 contrôlé par un circuit approprié 6224 également monté sur la carte. En variante,

évidemment, le système peut être agencé sous la forme d'un dispositif de lecture statique, à champ de vue. Montée par dessus la fenêtre du scanneur 6202, on trouve de préférence une feuille de matière transparente 6226 de tous types appropriés. Egalement prévu à la fenêtre du scanneur 6202, on trouve un photodétecteur 6228 qui reçoit le faisceau lumineux réfléchi à partir des indices imprimés. Le réflecteur 6228 est connecté à un circuit de traitement approprié en 6224 convenant pour décoder l'information.

Dans un mode de réalisation encore différent, un lecteur wand ou du type à stylet du type décrit d'une manière générale ci-dessus peut être utilisé pour détecter de la fausse monnaie. Des dispositifs sont connus pour la détection de fausse monnaie sur la base de divers paramètres tels que la couleur, la qualité d'impression, etc. Il est proposé d'incorporer un tel dispositif dans les agencements représentés pour offrir une option encore différente pour l'exploitation. Il existe actuellement des propositions concernant l'incorporation de codes à barres sur des grosses coupures, auquel cas le lecteur pourrait être utilisé à la fois pour lire le code à barres et pour détecter si le billet scanné est un faux. Dans les pays où existe un contrôle des changes, les billets peuvent être scannés au moment de la distribution et l'information retenue dans le lecteur. Au moment du téléchargement du lecteur en utilisant, par exemple, un puits de données, l'information concernant les billets de banque en circulation peut être maintenue, permettant là encore, d'empêcher la contrefaçon.

La gamme d'applications du système pris dans son ensemble est évidemment très large. Par exemple, un consommateur pourrait utiliser le lecteur wand tout en se trouvant dans un avion ou un autre endroit à partir duquel l'accès à l'Internet ou à un réseau informatique approprié n'est pas immédiatement disponible. En plus des applications décrites ci-dessus, le système pourrait être utilisé pour stocker et consulter l'information concernant des articles dans beaucoup d'autres applications, par exemple dans les systèmes de stockage en entrepôts.

On peut voir que les enseignements ci-dessus concernant tout type de

scanneur approprié au scannage "à la main" et qui soit essentiellement portable, capable de lire un symbole de codes à barres ou un symbole portant une information similaire. L'information peut être téléchargée à partir de la mémoire se trouvant dans le scanneur tenu à la main au moyen de toute interface appropriée vers un ordinateur personnel ou autre point d'accès ou réseau informatique, et l'information correspondante appelée à partir d'un site web ou d'un emplacement mémoire principale correspondant.

Les figures 31, 32a et 32b représentent les composants de base d'un système selon la présente invention. Un terminal portable 710, par exemple un ordinateur qui tient dans la main du type assistant numérique personnel également appelé "organiseur" qui peut être optionnellement muni de capacités de scannage/lecture de codes à barres, est agencé pour être interfacé avec une base ou berceau 712 via une connexion physique. Par exemple le terminal 710 est inséré dans un logement approprié 714 prévu dans le berceau 712. Le berceau 712 est lui-même connecté via un système hôte 715 qui peut être un ordinateur autonome, ou faire partie d'un réseau Intranet/RLE ou Internet/WAN (réseau à grande distance).

Les composants de base du terminal 710 du berceau 712 et de l'hôte 715 sont standard et interconnectés de manière classique en utilisant des interfaces et des protocoles de communication connus excepté lorsque cela est autrement mentionné ci-après. En conséquence, des détails complets concernant l'équipement matériel des composants ne sont pas décrits ici étant donné qu'ils seront bien connus du lecteur expérimenté. Une brève description des divers composants et de leur usage et interconnexion est néanmoins donnée ci-après.

Comme représenté sur la figure 32a, le terminal comprend de manière classique une entrée utilisateur 716, une "autre entrée" 718, un pilote d'affichage 720, une liaison distante 722, un processeur 724, une mémoire 726, et une interface de berceau 728.

L'entrée utilisateur 716 peut comprendre, par exemple, un clavier avec

lequel l'utilisateur peut entrer des informations dans le terminal. L'entrée utilisateur est transférée vers le processeur et ultérieurement traitée comme décrit ci-après.

L'"autre entrée" 718 peut comprendre, par exemple, un scanneur ou autre lecteur de codes à barres, une entrée de caméra vidéo, une entrée audio ou toute autre entrée de données appropriée. La figure 31 représente un terminal 710 comportant une tête de lecteur 718 de codes à barres montée en pivot. L'information introduite est transférée vers le processeur 724 pour un traitement supplémentaire comme décrit ci-après.

Le terminal 710 comporte de préférence un écran d'affichage 719 pour afficher l'information à l'attention de l'utilisateur. Par exemple, l'écran peut représenter des données d'entrée à des fins de vérification, ou porter des messages d'instructions ou d'erreurs destinés à l'utilisateur, ou même des messages de communication transmis à partir de points distants. Le pilote d'affichage commande l'affichage et reçoit des instructions d'affichage à partir du processeur.

Le terminal peut être un écran de télévision du type TRC (tube à rayon cathodique), un écran du type LCD (diode électroluminescente) à panneau plat ou tout autre écran approprié. L'avantage des afficheurs à écran plat réside évidemment dans leur faible volume en plus du caractère compact du terminal dans son ensemble.

Une liaison distante 722 est prévue pour permettre la communication entre le terminal 710 et le berceau 712 (ou en fait tout autre point d'accès tel que défini par les paramètres opérationnels du système) tel qu'un procédé infrarouge IRDA, à faisceau hertzien, à fréquence radio ou tout autre procédé approprié. Les données dirigées vers ou provenant de la liaison distante sont traitées par le processeur 724.

Le processeur 724 peut comprendre tout système de traitement classique tel qu'une CPU (unité centrale de traitement). Le processeur permet le contrôle centralisé des autres composants comme décrit ci-avant et ci-après,

de même que les conditions générales d'exploitation du terminal, des données et des contrôles de l'état de l'alimentation, des contrôles de compatibilité, etc., comme cela est approprié.

Une mémoire 726 est représentée séparément du processeur 724 bien qu'elle puisse être incorporée dans la même unité que le processeur 724. La mémoire 726 permet un stockage des données à long ou court terme par exemple des données reçues à l'entrée utilisateur ou autre entrée 716, 718, via la liaison distante 722 ou, comme décrit plus en détail ci-après, via l'interface berceau. Le contrôle, la gestion et le transfert de la mémoire peut être contrôlé par le processeur 724.

L'interface berceau 728 permet le téléchargement de données stockées dans le terminal 710 vers le berceau 712 de même que le transfert de contrôle ou d'autres données à partir du berceau 712 vers le terminal 710. L'information destinée à l'interface berceau 728 et provenant de cette dernière est traitée par le processeur 724 comme approprié. Comme décrit plus en détail ci-après, l'interface berceau/terminal est une interface physique qui opère pendant, et peut être activée par, l'introduction du terminal 710 dans le logement 714 du berceau 712.

Le berceau 712 comporte également divers composants représentés de manière synoptique sur la figure 32a, tout en étant agencé pour traiter du contrôle et des communications avec le terminal 710 de même que la communication avec l'hôte et autres fonctions périphériques.

Le berceau 712 comporte un processeur 730 pour contrôler les composants restants comme décrit ci-après, de même que les conditions d'exploitation du berceau 712 et les besoins généraux en communication entre le berceau 712 et le terminal 710, entre le berceau 710 et l'hôte 715 et, lorsque le berceau agit de manière transparente, entre le terminal 710 et l'hôte 715.

Le berceau comprend de plus une mémoire interne 732 et une mémoire externe 734. Toutes deux sont destinées au stockage de l'information reçue à partir de l'hôte 715 et/ou du terminal 710 pour le transfert entre les deux, tel

que géré par le processeur 730. La mémoire interne peut, par exemple, constituer une part intégrante de l'unité processeur 730. La mémoire externe 734 fait usage de préférence de dispositifs de stockage externe tels que des disques, etc.

Le berceau 712 communique avec le terminal 710 au moyen d'une interface de terminal 736 communiquant avec l'interface berceau 728. Les interfaces terminal et berceau sont de préférence des interfaces physiques comme décrit ci-dessus. L'information destinée au terminal 710 et provenant de ce dernier peut être gérée via un processeur 730. Le berceau 712 comporte de plus une interface hôte 738 pour communiquer avec l'hôte 715. L'interface peut être une interface câblée ou une interface sans fil de type connu comme approprié. Un contrôleur de communication 740 peut également être prévu en plus pour gérer les divers protocoles de communication entre le terminal 710, le berceau 712 et l'hôte 715.

Une liaison distante 742 est prévue dans le berceau 712 pour la communication avec la liaison distante 722 du terminal 710. La communication peut, comme décrit ci-dessus, être tout moyen de communication sans fil tel qu'une communication infrarouge IRDA, radio ou à faisceau hertzien.

Le berceau 712 peut également comporter divers périphériques de type classique qu'on trouve d'une manière générale avec les ordinateurs telles qu'une imprimante 744 ou autre composant tel qu'un écran agrandi, une liaison modem vers un hôte distant, des capacités de stockage ou de traitement additionnel, etc.

Le berceau 712 communique via l'interface hôte 738 avec l'hôte 715. L'hôte 715 peut être un ordinateur autonome ou faire partie d'un réseau local d'entreprise tel que l'Intranet. L'Intranet peut lui-même faire partie de l'Internet aux autres réseaux à grande distance, et si approprié des mesures de sécurité appropriées telles qu'un "pare-feu" peuvent être mises en place.

De nombreuses applications et avantages sont fournis par le système représenté sur les figures 31, 32a et 32b. En particulier, tous les avantages

propres à un terminal qui tient dans la main sont disponibles, tels que la portabilité, la facilité d'utilisation, et l'adéquation à des usages mobiles ou itinérants. Des applications particulières comprennent les travaux d'inventaire, le contrôle des marchandises transportées, l'utilisation au point de vente, les formulations en matière de bourse des valeurs, les ventes aux enchères, etc. Du fait que le berceau comporte une interface de données, l'information introduite au terminal, par exemple une saisie au clavier ou une entrée de codes à barres peut être stockée à court terme dans le terminal et transférée à intervalles réguliers vers le berceau lorsqu'il est introduit dans le berceau. Une fois l'information téléchargée, la mémoire du terminal peut être effacée. Au même moment, des données de contrôle ou d'application peuvent être transférées à partir du berceau vers le terminal si bien que l'application du terminal peut être modifiée ou mise à jour comme souhaité. Le terminal comporte de plus de préférence un module de charge de batterie qui se connecte au terminal lorsque ce dernier est introduit dans le berceau pour permettre une recharge de batterie simultanée. Cette option est décrite plus en détail ci-après.

Le berceau communique ensuite l'information téléchargée à l'hôte, et permet la communication d'information de mise à jour/application à partir de l'hôte vers le terminal.

En conséquence, le système permet une mise à jour rapide de la base de données hôte avec des informations provenant du terminal tout en nécessitant une capacité mémoire réduite au niveau du terminal. Au même moment, le berceau permet des bénéfices importants en terme de temps-efficacité, à la fois en réduisant la participation utilisateur dans le transfert de données à une valeur minimale et en permettant l'utilisation des temps morts utilisateurs pour télécharger l'information. La liaison distante permet de plus une capacité de mise à jour immédiate lorsque nécessaire, en permettant en même temps à cette capacité d'être maintenue à un minimum (au moyen de sessions de téléchargement régulières), ce qui conduit à une réduction

correspondante de la consommation d'énergie.

Comme décrit plus en détail ci-après, des avantages particuliers de l'invention reposent sur un système dans lequel le système de base décrit en référence aux figures 31, 32a et 32b est amélioré, et les tâches mémoire/calcul réparties de manière à autoriser une flexibilité maximale et une demande minimale sur le terminal 710. Des ordinateurs tenus dans la main connus sont continuellement mis à jour et re-modélisés pour autoriser une capacité mémoire, un stockage de données et une disponibilité d'applications maximaux. D'une manière générale, ceci implique une augmentation du coût et de la complexité du système, et conduit à un accroissement en poids et en volume qui est évidemment indésirable pour un système portable. De plus, les frais généraux relatifs au système sont très élevés - la mise à niveau de l'ordinateur est onéreuse et doit être effectuée sur une base individuelle, et basée sur des périphériques ou des logiciels ajoutés qui peuvent représenter une charge financière considérable. Cette tendance à une capacité interne et à des possibilités accrues conduit à un plus grand risque de défauts ou d'erreurs et aux inconvénients qui en découlent. De tels systèmes sont actuellement connus sous la dénomination de "clients lourds".

La présente invention d'autre part, autorise un "client ultraléger". En principe, ceci est réalisé en réduisant la charge de calcul et mémoire du terminal dans la plus grande mesure possible et en incorporant cette charge par contre à l'intérieur du berceau ou, si possible, dans l'hôte lui-même. Ceci permet également au berceau 712 de fonctionner en tant que "client léger". En conséquence, le terminal comporte la capacité minimale pour l'interface utilisateur, à savoir la capacité d'affichage, la capacité d'entrée utilisateur ou autre, la capacité mémoire et de traitement minimal et la capacité de communication décrite ci-dessus. Le berceau/hôte agit ainsi en tant que véritable ordinateur, assurant une majeure partie de la capacité de traitement et mémoire, y compris les unités de disque, l'interface de communication, etc. Etant donné que le berceau agit comme un client léger, sa simplicité et son

adaptabilité peuvent être maintenues en assurant que le maximum de traitements puisse être effectué au niveau de l'hôte.

Une architecture de base autorisant un client ultraléger est représenté sur la figure 33. Des références numériques similaires sont utilisées pour décrire les caractéristiques similaires tout au long du mémoire descriptif et l'explication concernant les diverses caractéristiques ne sera pas répétée en détail excepté lorsque cela est approprié.

On peut voir que le terminal 710 supporte toujours des capacités de base diverses dans la même mesure que la version représentée sur la figure 31, en particulier les entrées utilisateur et "autres" 716, 718 et l'interface berceau et la liaison distante 728, 722 doivent conserver un grand nombre de leurs caractéristiques afin que le terminal 710 puisse exécuter ses fonctions frontales de base de manière adéquate. Cependant, le processeur, la mémoire et le pilote d'affichage sont tous consolidés en une seule unité à spécification inférieure, une fois de plus suffisante pour piloter les fonctions frontales de manière adéquate. La gestion des fonctions transférées et par conséquent gérée par le berceau et/ou l'hôte. Par exemple, le traitement des données introduites au terminal peut être effectué par le berceau après que l'information a été téléchargée si bien que le terminal nécessite de porter et de mémoriser uniquement des données brutes, ce qui requiert moins d'espace mémoire et de puissance de traitement. Le berceau fonctionne également en tant que client en termes de stockage de données externes et d'application périphérique telle que l'impression et l'affichage. Le berceau 712 communique ensuite avec l'hôte 714. Ce qui est plus important, cependant, réside dans le fait que l'hôte lui-même fournit le support des applications comme décrit plus en détail ci-après. En outre, l'hôte peut prendre en charge un plus grand nombre des fonctions du berceau comme approprié si cela est souhaité pour réduire les spécifications du berceau, aussi longtemps que le berceau maintient ses fonctions de base de téléchargement et intermédiaire.

En se référant une fois de plus aux "clients lourds" classiques, des

applications destinées à être exécutées par le terminal telles que des applications commerciales destinées à des objets à évaluer, des services de base de données, de fichier, de courrier, d'impression et de répertoire et autres fonctions dédiées, sont prévus en interne par rapport au terminal lui-même. Ceci nécessite des exigences en mémoire et en traitement considérables, ajoutées à la complexité et au volume et la nécessité d'une mise à jour régulière et d'un entretien est tout-à-fait probable.

La présente invention, cependant, fonctionne conformément à un système différent, les applications décrites ci-dessus telles que les bases de données, la messagerie ou autres alternatives telles que des systèmes d'inventaire, des systèmes de tarification/de codage, des applications de tableur et de traitement de textes sont stockés ni sur le terminal, ni sur le berceau mais sur l'hôte auquel le berceau a accès. Ces applications sont fournies et maintenues par un serveur central ou des serveurs répartis sur le réseau hôte comme approprié, autorisant une mise à jour et une maintenance de contrôle central. De plus, des copies multiples du logiciel d'application ne sont pas requises pour un stockage permanent sur un grand nombre de terminaux indépendants, ce qui conduirait à des charges encore supplémentaires en terme de coût de licence et des difficultés de maintenance et de mise à jour.

Lorsqu'on souhaite faire usage des applications spécifiques, cette application peut être appelée au niveau du berceau et mise en antémémoire pour une utilisation dynamique, et supprimée lorsqu'elle n'est plus nécessaire. En conséquence, la quantité de mémoire requise est considérablement réduite. Par exemple, lorsque l'on souhaite traiter des données entrées au terminal suivant une application spécifiée, l'application peut être appelée à partir de l'hôte et traitée au berceau 712, et les résultats stockés dans la mémoire interne ou externe, imprimés, affichés sur un écran approprié ou téléchargés vers l'hôte pour un traitement supplémentaire. Dans une autre variante, les données provenant du terminal peuvent être transférées à partir du berceau

vers l'hôte sous forme de données brutes avec des instructions destinées au moyen de traitement et le traitement effectué au niveau de l'hôte, ce qui réduit encore davantage la charge mémoire et de traitement sur le terminal et le berceau.

Comme décrit ci-dessus, il existe de nombreuses applications pour le système de la présente invention, par exemple dans le domaine du transport et de la logistique, de l'entreposage, de la sécurité publique, de la vente au détail et toute autre entreprise reposant sur un flux de données rapide et efficace et nécessitant la collecte et la transmission de données sous forme portable. Comme décrit plus en détail ci-après, une implémentation possible du berceau comprend un berceau sans fil basé sur un véhicule communiquant avec des points d'accès via une communication sans fil. Ceci permet une utilisation basés sur des véhicules, encore plus appropriée au transport dans les sociétés de course ou de messagerie, aux utilitaires, aux organisations de sécurité publique, à la vente et à la maintenance sur le terrain et toute autre opération itinérante.

Un mode de réalisation possible du terminal selon la présente invention est représenté avec plus de détails sur la figure 34a. Le terminal 710 est de préférence façonné en ayant à l'esprit des considérations ergonomiques permettant une utilisation, un transport et un stockage aisés par l'utilisateur. Une caractéristique importante du terminal réside dans l'écran d'affichage 750. Ce dernier peut être par exemple un écran LCD ou vidéo. Il est de préférence à haute définition, suffisante pour représenter des icônes détaillées et de préférence, des images vidéo détaillées comme décrit plus en détail ci-après. Le terminal 710 supporte des fonctions appropriées au scannage laser et/ou à la collecte de données à base de stylet. Par exemple, le terminal 710 peut comporter un composant lecteur 752 qui peut être intégré comme représenté ou modulaire. Le lecteur 752 est agencé pour le scannage au laser d'indices graphiques tels que des codes à barres et comporte les caractéristiques de composant de base d'un lecteur, à savoir un moyen d'émission de faisceau de

lecture tel qu'une diode laser, un moyen de détection du faisceau de lecture réfléchi et un moyen de balayage du faisceau si cela est souhaité, par exemple un miroir oscillant (dans le cas d'un scanneur optique à "spot mobile"). Si le scanneur est un scanneur à "champ de vue", d'autre part, aucun moyen de scannage n'est requis, et le détecteur comprend un réseau CCD (semi-conducteur à couplage de charge). Les données collectées par le lecteur 752 sont traitées comme "autre entrée" représentée sur le bloc 718 des figures 32a et 33 en rapport avec le terminal, et les données sont traitées en conséquence.

De plus, le terminal 710 peut comporter un stylet de données 754. De telles caractéristiques sont connues dans l'art. En particulier, le stylet de données 754 peut être utilisé pour écrire directement sur l'écran 750 du terminal 710, soit pour l'entrée des données, pour la capture et la vérification de signatures ou à d'autres fins appropriées de collecte et de vérification de données. Le terminal 710 comporte également un haut-parleur audio 756 permettant à des signaux d'alarme et/ou autre message audio tel qu'une parole issue de synthèse vocale ou une voie humaine d'être délivré par le terminal à l'attention de l'utilisateur, de même qu'une entrée audio telle qu'un microphone par exemple pour la communication vocale bidirectionnelle.

Les figures 34b à 34f représentent une variante d'implémentation de terminal 745. Le terminal 745 comporte un écran d'affichage 746, des commandes 747a, 747b et un haut-parleur 748. Le terminal est agencé pour une communication sans fil avec, par exemple, un réseau Intranet local. Les messages envoyés par le terminal 745 sont affichés sur l'écran d'affichage 746. Des messages simples peuvent également être relayés à partir du terminal 745, en variante le terminal 745 peut relier des informations de base concernant la localisation ou l'identification de l'utilisateur. De préférence, l'écran 746 est un écran basé sur des icônes sur lequel, par exemple, l'utilisateur peut choisir des messages destinés à être relayés vers le réseau en faisant défiler l'écran entre les icônes appropriées en utilisant les boutons de commande 747a, 747b. Le terminal 745 peut comporter également des

capacités audio soit pour émettre un signal court du type "beep" lorsqu'un message est reçu soit, dans des versions plus sophistiquées, incorporer un synthétiseur vocal qui avise l'utilisateur qu'un message a été reçu ou en fait prononce le message. Le terminal 745 peut également comporter un microphone (non représenté) permettant à des messages audio d'être relayés vers le réseau via le terminal 745. Pour la facilité d'utilisation, le terminal comporte également de préférence une pince 749 lui permettant d'être fixé de manière amovible sur un vêtement de l'utilisateur.

Le système intègre de préférence une gestion de l'économie d'énergie/gestion de l'économie d'énergie distribuée pour s'assurer que pour les composants portables au moins l'alimentation est utilisée de manière aussi efficace que possible permettant d'obtenir une durée de vie complète de l'alimentation. En particulier, lorsque le terminal est capable d'exécuter des tâches différentes en utilisant des composants différents, l'utilisation de l'alimentation pour chaque composant est de préférence répartie par réglage individuel en fonction de chaque composant afin d'optimiser la demande en énergie pour satisfaire les exigences en énergie nécessaire.

Une application de vente au détail selon l'invention est représentée sur la figure 35. Un consommateur 760 entre dans un dépôt de vente au détail tel qu'un supermarché (non représenté), ou tout autre magasin approprié vendant des marchandises ou des produits. Le dépôt de vente au détail fournit automatiquement une pluralité de terminaux portables 710 entreposés dans un emplacement pratique dans leurs berceaux respectifs 712. Le consommateur 760 choisit un terminal 710 à partir d'un berceau 712. Comme représenté, le dépôt de vente au détail propose une variété de produits par exemple sur des étagères 762 ou des comptoirs 764. Sont également prévus dans le dépôt de vente au détail, une pluralité de transmetteurs ou de points d'accès 66 radio ou autres moyens sans fil appropriés, en des emplacements adéquats.

Au fur et à mesure que le consommateur 760 se déplace dans le dépôt de vente au détail, les points d'accès 766 diffusent vers le terminal 710. Le

terminal 710 utilise des systèmes de priorité connus et/ou des algorithmes pour n'accepter que les signaux provenant du point d'accès 766 le plus proche. Le point d'accès 766 transmet l'information concernant les produits disponibles dans la proximité du terminal 710 pour un affichage sur l'écran 750. Le terminal 710 reçoit les signaux via la liaison distante 722 représentée sur la figure 32a.

L'information transmise par le point d'accès 766 vers le terminal 710 peut prendre diverses formes, et dans un mode de réalisation préféré le terminal affiche des icônes graphiques représentant des produits disponibles dans la localité, comme représenté sur la figure 36. Par exemple, lorsque le consommateur est dans le voisinage du rayon lessive et le terminal 710 choisit un signal de diffusion à partir du point d'accès 766 le plus proche, les produits disponibles dans le rayon lessive peuvent apparaître sur l'écran 750 du terminal tels que du liquide vaisselle ou liquide de lavage normal 770, 772, respectivement. Des représentations picturales réelles des produits peuvent apparaître pour offrir une facilité de référence au consommateur. Des informations annexes telles que le prix, l'emplacement, et toute offre promotionnelle peuvent également être fournies en 774. En conséquence, l'environnement de vente au détail peut être réalisé sur mesure pour une efficacité optimale.

Un point d'accès 766 dédié ou chacun de la pluralité des points d'accès 766 peut également fournir, par exemple, une carte du dépôt de vente au détail et des produits trouvés comme représenté sur la figure 37. De manière optionnelle, la carte pourrait inclure un marqueur 776 indiquant la position actuelle de l'utilisateur - ceci pourrait être estimé en déterminant lequel des points d'accès se trouve en cours de communication avec le terminal, ou un système de positionnement géométrique simple pourrait être utilisé. En fait, un tel système de positionnement permettrait de plus au message diffusé vers le terminal d'être dépendant de la position du consommateur telle qu'établie par le système de positionnement plutôt que comme déterminée par la localisation du point d'accès le plus proche.

Le terminal peut comporter un écran d'options préliminaires, comme représenté sur la figure 38a qui est affiché à l'attention du consommateur lorsque ce dernier accède la première fois au terminal. Divers icônes sont représentées selon les fonctions que le consommateur souhaite utiliser. Les icônes peuvent être atteints et traités par le consommateur de diverses manières connues, par exemple en utilisant un rouleau de lecture intégré du type "souris" monté sur le scanneur, en prévoyant un écran tactile, en ayant un "crayon numérique" agencé pour interagir avec l'écran ou en utilisant un clavier sur le terminal. Les icônes peuvent comprendre les suivantes : entrée des informations d'identification personnelles 780, carte 782, information produit 784, offre actuelle 786, produits se trouvant dans le voisinage de l'utilisateur 788, paramètres du terminal 790, description d'un rayon local 792 et aide 794. On notera que beaucoup d'autres icônes et fonctions peuvent être incorporées comme mises en évidence par la description suivante.

L'exploitation de l'écran initial et des écrans suivants est représentée par l'organigramme montré sur la figure 38b. Au stade 7100, le terminal est retiré du berceau qui amorce automatiquement la présentation de l'écran d'option. Le terminal attend ensuite une sélection d'une option donnée en 7102. Le système se déplace alors vers le sous-menu requis par les icônes 780 à 794.

Si l'icône 780 d'entrée des informations d'identification personnelle est choisie, alors le terminal attend l'entrée de l'information pertinente. Ceci peut être, par exemple, réalisé en entrant une carte de crédit ou autre numéro d'identification, en glissant une carte magnétique appropriée dans une fente du terminal ou en utilisant les capacités de lecture de codes à barres sur le terminal pour lire l'information d'identification personnelle codée avec des codes à barres. Ceci est représenté d'une manière générale en 7104. Une fois l'information entrée, le crédit ou le débit automatique des articles scannés et achetés par le consommateur peut être initié, ou des informations additionnelles concernant les schémas d'achat et les préférences du consommateur peuvent être utilisées pour cibler le consommateur avec des

annonces publicitaires sur des produits choisis. L'information peut être relayée depuis le terminal vers les points d'accès via une communication sans fil. En variante, l'information d'identification de l'utilisateur peut être entrée alors que le terminal se trouve dans le berceau, par exemple via une fente pour carte à piste magnétique dite carte "swipe" prévue sur le berceau. En fait, ceci peut être utilisé pour libérer et initialiser le terminal comme mesure de sécurité supplémentaire. Une fois que l'information a été entrée et traitée comme approprié à l'étape 7106, le système retourne à l'écran des menus en 7102.

Si l'option carte est choisie ensuite, optionnellement, la position courante de l'utilisateur est identifiée en 7110 et la carte est affichée montrant cette information en 7112. Le consommateur a alors l'option de retourner vers le menu initial à l'étape 7108.

Lorsque l'information produit est requise en 784, le produit requis peut soit être saisi ou bien être choisi en utilisant une série de menus à portée descendante 7114 à 7116. Une fois le produit identifié le consommateur peut alors se voir présenter diverses options quant à l'information requise - prix, marques disponibles, offres disponibles, localisation, etc. en 7118. L'utilisateur peut également retourner à l'écran principal 7102 à l'étape 108.

Si le consommateur souhaite visualiser les offres courantes, en 786, alors l'offre type intéressante peut être choisie en 7118. Par exemple toutes les offres courantes peuvent être défilées devant l'utilisateur, les offres liées aux achats que l'utilisateur a déjà réalisés peuvent être montrées, les offres concernant une classe particulière de marchandises peuvent être représentées ou des offres dans le voisinage peuvent être montrées telles que choisies par une icône ou une entrée de données appropriée. L'utilisateur peut ensuite retourner à l'écran principal 7102 à l'étape 7120.

Si l'utilisateur souhaite chercher quels produits sont disponibles dans le voisinage, alors la position de l'utilisateur est établie en 7122 et des signaux de diffusion provenant des points d'accès 766 appropriés sont reçus et affichés en 7124. Cette option peut être maintenue par défaut afin de présenter des

informations appropriées au consommateur lorsque ce dernier évolue autour du point de vente au détail. Là encore, le consommateur a l'option de retourner à l'écran principal 7102 à l'étape 7126.

Si le consommateur souhaite choisir les paramètres du terminal à l'étape 790, les divers paramètres disponibles sont affichés à l'étape 7128. Ces paramètres peuvent être, par exemple, la luminosité de l'affichage, la taille de l'affichage, la langue, le volume (lorsqu'un synthétiseur vocal est intégré), etc. Le paramètre est ajusté comme approprié à l'étape 7130 et l'utilisateur peut ensuite retourner au menu principal 7102 à l'étape 7126.

Lorsque l'icône 792 "rayon local" est choisie, le rayon le plus proche peut être choisi en fonction de la position du consommateur, et le rayon affiché de manière picturale. Par exemple, lorsque le consommateur essaye de trouver un produit spécifique, le produit peut être mis en valeur. Cette option peut être utilisée conjointement avec le système de carte afin d'identifier un rayon donné comme représenté par le signe clignotant 7134 sur la figure 37. En variante, la représentation du rayon pourrait mettre en valeur des produits en promotion ou toute autre information pertinente à l'étape 7132.

Si l'icône d'aide 794 est choisie, alors le consommateur est invité à choisir laquelle des icônes nécessite des explications supplémentaires à l'étape 7136. Le message d'aide approprié 7138 est alors affiché en conséquence. Pour chacune des options, le consommateur a la possibilité de retourner à l'écran principal 7102.

On peut voir que le système offre une présentation très conviviale permettant au consommateur d'identifier des produits, de trouver où sont les produits concernant le consommateur, d'être informé des offres spéciales, etc. Lorsque l'information d'identification du consommateur est stockée le consommateur peut alors être ciblé avec une information mercatique/publicité personnalisée tenant compte de ses préférences spécifiques stockées. Le système peut être encore amélioré en incorporant un synthétiseur vocal ou autre moyen de diffusion de message audio dans le terminal si bien que le

terminal peut "parler" au consommateur pour passer des informations concernant divers produits offrant un intérêt et toute autre information pertinente.

Le système peut également avoir des applications dans les travaux d'inventaire et de gestion de stock du dépôt de vente (ou en fait des travaux de gestion d'entrepôt, etc. bien que la description suivante soit limitée au dépôt de vente au détail décrit ci-dessus). Par exemple, lorsqu'il est souhaité de réorganiser les rayons, un rayon dans sa forme courante peut être montré sur l'écran et le réagencement pourrait être effectué d'abord virtuellement en glissant-déplaçant les images appropriées pour montrer le déplacement des marchandises réelles sur les rayons. Les déplacements physiques pourraient suivre. Ceci permettrait d'avoir à la fois un guide quant à l'aspect des rayons réempilés et également un contrôle très utile pour s'assurer que les préposés au rayon soient en mesure de comparer les mesures qu'ils ont prises avec celles qui étaient nécessaires. En variante, pour un produit donné ou un nom de marque ou une classe de produit, en mettant en valeur la représentation de ce produit sur l'écran, des données pertinentes telles que l'inventaire, la livraison, l'historique des ventes, etc. peuvent être présentées à l'utilisateur. Un système similaire d'icônes et d'étapes peut être utilisé avec ceux décrits en référence aux figures 38a et 38b. Des terminaux dédiés pourraient être prévus à de telles fins dans le dépôt de ventes au détail décrit ci-dessus.

En variante, le préposé au remplissage du rayon, le gestionnaire du stock ou autre personnel qualifié peut entrer ses informations d'identification d'utilisateur dans le berceau avant de retirer le terminal si bien que le terminal est initialisé de manière appropriée. On appréciera le fait que le même système peut être utilisé pour les travaux d'inventaire dans les entrepôts ou des travaux de suivi général de produits, utilisant des icônes graphiques pour représenter des produits et permettre un accès rapide et convivial aux informations d'arrière-plan, de commande ou de destination.

On verra qu'une variété d'autres caractéristiques périphériques peut être

envisagée pour le système. Par exemple, le système peut comporter une alarme de portée si bien que si un terminal est sorti du magasin, ou en dehors de la zone désignée à l'intérieur du magasin, une alarme se déclenche. Par exemple, si le consommateur portant le terminal s'égare dans une zone où aucun point d'accès n'est disponible ou dans laquelle l'accès est d'une manière générale réservé au personnel alors l'alarme peut sonner. L'alarme est prévue à l'intérieur du terminal et peut opérer, par exemple, sur la base de signaux de portée provenant du point d'accès le plus proche pour établir si il a dépassé cette portée auquel cas l'alarme sonnera.

Le terminal peut être utilisé conjointement avec un système "auto-scannant" par l'utilisateur de manière que l'utilisateur scanne ces produits achetés individuellement, ce qui élimine la nécessité du personnel de contrôle et accélère généralement le processus de chalandage. Dans ce cas, le terminal peut stocker les détails d'achat contre l'information d'identification de l'utilisateur - lorsqu'approprié - pour mettre à jour les bases de données concernant le profil mercatique du consommateur particulier. Le scanneur peut également être utilisé pour lire des codes directement à partir des produits de manière que des informations additionnelles peuvent être appelées au terminal.

Le système décrit ci-dessus est particulièrement utile pour des clients "ultralégers" sous la forme de terminaux portables. Les capacités de base que doivent comporter le terminal lui-même sont le pilote d'affichage, les besoins minimaux requis en matière de mémoire et de traitement et les capacités de communication et les protocoles pour communiquer à la fois avec les points d'accès et le berceau. L'information concernant les produits, les cartes et autres aspects pertinents peut être consultée à la demande via les points d'accès à partir d'un hôte. Les données mémorisées concernant les schémas d'achat d'un consommateur donné et, comme approprié, les requêtes et autres transactions peuvent être téléchargées vers le berceau après chaque utilisation, ce qui réduit considérablement les besoins requis en mémoire. De manière similaire, les fonctions exactes requises pour le terminal par exemple

l'utilisation par le consommateur, l'utilisation à des fins d'inventaire, l'utilisation à des fins de remplissage, etc. peuvent être chargées à partir du berceau une fois que l'utilisation a été identifiée alors que le terminal est encore stocké dans le berceau. En conséquence, la charge mémoire et de traitement sur le terminal lui-même peut être maintenue à un minimum, autorisant une simplicité et une réduction en terme de coût de même qu'une facilité de mise à jour des applications, etc.

Dans une variante d'agencement, chaque terminal peut communiquer avec son berceau respectif si le magasin est d'une taille appropriée. En conséquence, l'implémentation client ultraléger/berceau léger peut être réalisée.

Le système peut être encore davantage amélioré de diverses manières. Par exemple, le terminal pourrait incorporer une partie scanneur détachable, si bien que le scanneur et/ou terminal sont chacun autonomes et accessibles de manière indépendante. Dans certaines circonstances, les capacités du terminal lui-même ou du scanneur lui-même seront seules requises et la charge additionnelle des autres composants ne serait pas souhaitée. Ce serait le cas par exemple lorsqu'un assistant numérique portable est requis.

Une autre possibilité serait d'adapter le format de l'affichage du terminal. Ceci serait de préférence incorporé en tant que possibilité logiciel dans le berceau, plutôt que de charger le terminal avec cette capacité. Le format d'affichage - c'est-à-dire le nombre de caractères dans la direction horizontale - pourrait être adapté à la longueur horizontale de l'écran du terminal. Pour rendre le système aussi convivial que possible, il serait préférable que le terminal communique des dimensions d'affichage au berceau si bien que le serveur/berceau peut formater automatiquement la page d'affichage pour s'ajuster à l'écran sans la nécessité d'un retour à la ligne automatique, c'est-à-dire qu'une ligne de texte initialement prévue pour être unique soit divisée en deux ou plusieurs lignes. A titre d'alternative au formatage automatique, une sélection prédéterminée d'options de format prédéfini disponible pourrait être

consultée, et l'option appropriée adoptée. Une variante de la méthode pour éviter le retour à la ligne automatique pour des lignes de texte serait de réduire l'échelle du texte pour créer une taille de fonte plus petite ce qui permet à une seule ligne d'être logée sans retour à la ligne automatique.

En plus de ses capacités de téléchargement/chargement/initialisation, de sécurité et de stockage, une autre fonction importante remplie par le berceau est une fonction de recharge des batteries. Chaque fois que le berceau reçoit un terminal, un contrôle du niveau des batteries est effectué et si les batteries sont en dessous du niveau de pleine puissance, ou un niveau de seuil de puissance prédéterminé, alors la recharge aura lieu automatiquement pendant le temps hors-service du terminal. Le terminal comporte des contacts appropriés agencés pour coopérer avec des contacts de charge sur le berceau lui-même d'une manière connue. La technologie de recharge des batteries est bien connue de l'homme de l'art et ne sera pas décrite en détail ici.

Une configuration de charge est représentée sur la figure 39. Selon cette configuration, le terminal 710 comporte un bloc batteries rechargeables 7010 qui peut être introduit de manière amovible dans le terminal et comporte des contact d'alimentation appropriés 7012, 7014 destinés à coopérer avec des contacts correspondants montés dans le terminal 710. Le bloc batteries 7010 comporte une pluralité de piles d'alimentation 7016 qui sont soit maintenues à demeure dans le bloc batteries 7010 ou remplaçables pour prolonger la vie du bloc batteries dans son ensemble. Le bloc batteries 7010 est logé dans un chargeur 7020 qui comporte une ou de préférence d'une pluralité de logements de blocs batteries 7022, 7024, 7026. Le chargeur 7020 est alimenté à partir d'une source d'alimentation appropriée représentée schématiquement en 7028. Ce système permet à des blocs batteries multiples d'être rechargés en même temps, si bien qu'une pluralité de terminaux peut opérer sur un bloc batteries complètement chargé alors qu'un bloc batteries de remplacement est en train d'être chargé. Ceci réduit le temps hors-service des terminaux portables à un degré qui n'est limité que par la disponibilité des blocs batteries et des

chargeurs.

Le chargeur 7020 peut être incorporé dans un berceau ou bien être fourni séparément selon le cas.

Il est nécessaire dans tout agencement de ce type d'introduire un circuit adaptateur qui détermine la vitesse de charge et d'autres paramètres dépendant de la nature à la fois du bloc batteries et du chargeur. De manière classique, un tel circuit adaptateur est prévu dans le chargeur lui-même, ce qui réduit le poids et la complexité du bloc batteries portable en conséquence. Selon un aspect de la présente invention, cependant, le circuit adaptateur est prévu sur le bloc batteries lui-même par exemple sur une face inférieure telle que représentée schématiquement en 7030. Selon ce système, l'opération de charge et la conception du chargeur 7020 sont substantiellement simplifiées. En particulier, le bloc batteries 7010 peut être introduit dans le chargeur configuré de manière appropriée et le circuit adaptateur 7030 prévu sur le bloc batteries 7010 adapte les opérations en conséquence. L'utilisateur par conséquent n'a pas à passer du temps pour s'assurer que le chargeur adéquat 7020 a été choisi. Des améliorations encore autres du terminal sont décrites dans les paragraphes suivants.

Dans une variante encore révisée représentée sur la figure 62, chaque bloc batteries 7600 est prévu avec un adaptateur 7602 qui reçoit dans un logement approprié tel que celui représenté en 7604, la totalité ou une partie du bloc batteries 7600. Dans le mode de réalisation représenté, le bloc batteries 7600 comporte une partie de connexion 7606 en saillie qui est reçue dans le logement 7604 de l'adaptateur 7602. La partie de connexion 7606 et le logement 7604 ont des contacts complémentaires représentés d'une manière générale en 7608 pour l'alimentation, etc.

L'adaptateur 7602 est logé dans une unité de base 7610 et fournit une interface appropriée entre le bloc batteries 7600 et l'unité de base 7610. Des contacts complémentaires représentés d'une manière générale en 7612 sont prévus sur l'adaptateur 7602 et une cavité de logement d'adaptateur 7614 sur

l'unité de base 7610 pour la transmission de l'énergie, etc.

L'adaptateur 7602 comporte toute l'électronique de charge à l'exception des lignes d'alimentation elles-mêmes. En conséquence, le contrôle du processus de charge est réalisé comme décrit plus en détail ci-dessus. L'adaptateur 7602 peut comporter des indicateurs tels que des LED (diode électroluminescente) représentés d'une manière générale en 7616 pour indiquer "charge achevée", "erreur", "charge en cours", etc.

On peut voir que l'unité de base 7610 est une unité à logements multiples permettant la charge d'une pluralité de blocs batteries via des adaptateurs respectifs simultanément. L'unité de base 7610 peut se passer d'une alimentation interne 618 ou d'une alimentation externe 7620 comme approprié.

S'il est souhaité de ne charger qu'un seul bloc batteries alors l'adaptateur peut comporter de plus un connecteur d'alimentation pour une connexion directe à une source d'alimentation. En conséquence, dans ces circonstances, l'unité de base 7610 n'est pas du tout requise.

Selon une autre encore des variantes, il est connu de prévoir des batteries "intelligentes" comportant une électronique complexe telle que des EEPROMS (mémoires mortes programmables et effaçables électriquement), un circuit d'entrée/sortie etc. Ces batteries intelligentes communiquent avec le chargeur ou autre hôte pour prévoir des paramètres divers dont la jauge de gaz, l'état de charge, le nombre de cycles, etc. Des batteries intelligentes, cependant, alourdissent considérablement le coût d'un bloc et à la fin du cycle de vie limité des piles (habituellement quelques centaines de cycles) on doit se débarrasser du bloc batteries intelligent en entier.

Ceci peut être surmonté en utilisant un bloc batteries 7010 du type représenté sur la figure 39. Dans ce cas, les piles 7016 sont remplaçables, l'électronique intelligente étant maintenue dans le bloc batteries 7010. Par exemple, on peut accéder aux piles à travers une porte ou un couvercle comme approprié. En conséquence, l'électronique coûteuse et le boîtier du bloc

batteries onéreux peuvent être épargnés et utilisés de manière répétée.

Les figures 63a et 63b illustrent d'autres encore des variantes des agencements bloc batteries/chargeur. Dans des systèmes connus, les blocs batteries sont chargés au moyen de chargeurs miniatures qui sont soit incorporés dans la large sortie du type prise d'un boîtier ou dans un module en matière plastique qui est fixé extérieurement au bloc batteries. Les deux solutions nécessitent, à l'extérieur du bloc batteries, soit un cordon, soit des pièces de module. Dans les agencements représentés sur les figures 63a, 63b, tout dispositif de charge externe de ce type destiné à charger les batteries est éliminé en prévoyant un bloc batteries 7630 comportant, comme représenté d'une manière générale en 7632 sur la figure 63b, un composant chargeur tel qu'un convertisseur courant alternatif/courant continu, une électronique de charge, une jauge de gaz, tous incorporés comme composants permanents. Deux variantes de types de blocs batteries 7630 sont proposées. Sur la figure 63a, le bloc est jetable après que les piles individuelles (non représentées) ont atteint leur limite de durée de vie. Sur la figure 63b, on peut voir que le bloc batteries 7630 comporte, par exemple, un couvercle articulé 7634 (sur lequel la fiche rétractable 7636 est montée de manière optionnelle) ce qui permet aux piles 7638 d'être remplacées après qu'elles ont atteint leur limite de vie. On peut voir que le bloc batteries 7630 tel que représenté sur la figure 63b comporte des contacts appropriés 7640 contre lesquels les piles 7638 peuvent être montées pour le fonctionnement du bloc batteries 7630.

Dans un mode de réalisation, il peut être souhaité d'autoriser la "location" des terminaux - par exemple lorsque l'utilisation des terminaux est en supplément et optionnelle. Le berceau comporte un verrou physique sur le terminal et/ou quelques formes de verrou d'alimentation/accès si bien que, sans autorisation, l'utilisateur ne peut pas libérer le terminal du berceau, ou ne peut pas utiliser de terminal. L'autorisation peut être obtenue par identification de l'utilisateur appropriée, par exemple en introduisant une carte de crédit ou autre moyen d'identification de l'utilisateur dans le berceau. Si l'autorisation est

donnée, le verrou est libéré et l'utilisateur peut retirer et utiliser le terminal. Au même moment, le temps de libération est chronométré de manière que l'utilisateur soit facturé pour le temps de location jusqu'à ce que le terminal soit rentré au berceau auquel moment le compteur de temps cesse de l'incrémenter. La facturation peut être effectuée automatiquement lorsqu'approprié, sur la carte de crédit de l'utilisateur. Une possibilité que le terminal pourrait incorporer serait un téléphone portable ou téléphone cellulaire auquel cas le terminal/berceau serait un outil de mercatique pour louer des téléphones cellulaires pendant une période de temps donnée. Quelle que soit l'utilisation souhaitée, des contrôles opérationnels pourraient être effectués par le berceau lorsque le terminal revient à lui afin de s'assurer qu'il est en état de fonctionner et n'a pas été détérioré pendant la période de location. Si des dégradations ont eu lieu, alors l'utilisateur sera identifié par l'information d'identification et peut être facturé de manière appropriée. De plus, l'information peut être mémorisée si bien que dans le futur, l'utilisateur ne sera pas autorisé à utiliser le terminal ou seulement à un taux de surprime.

Dans les cas où le terminal consiste dans un téléphone cellulaire ou incorpore un téléphone cellulaire, une possibilité automatique peut être prévue par laquelle le terminal/téléphone fonctionne sur un RLE sans fil comme option préférée par défaut, mais si le terminal est hors de portée du point d'accès (comme défini par un niveau prédéterminé de fiabilité dans les communications) le système utilise la possibilité téléphone cellulaire. En conséquence, l'utilisateur peut se connecter à la destination souhaitée même s'il se déplace à l'extérieur de la zone du RLE sans fil, ce qui rend le réseau appelant transparent à l'utilisateur dont la seule préoccupation est d'être sûr que les communications soient assurées.

Il est de plus souhaité d'autoriser des terminaux portables individuels de s'interconnecter les uns aux autres. Cette interconnexion peut être effectuée en utilisant tout protocole approprié, par exemple le système décrit dans l'article "Routing in Adhoc Networks of Mobile Hosts" (routage dans des réseaux ad

hoc d'hôtes mobiles), par David B. Johnson, 1995, IEEE pages 158-163. En particulier, un protocole spécifique au réseau d'hôtes mobiles est requis tenant compte de la mobilité des hôtes et de la portée de transmission limitée. Un hôte source cherche une route vers un hôte cible via des hôtes intermédiaires en diffusant un paquet de demandes qui enregistre sa route vers l'hôte cible. Le paquet de demandes comporte un identificateur de demandes de manière que les hôtes intermédiaires ignorent tout sauf la première copie du paquet de demandes. Le nombre total d'étapes est limité. En conséquence, le chemin le plus court peut en général être trouvé avec un minimum de surcharge de communication. Bien que les routes soient découvertes de cette manière, la route peut également être maintenue et des problèmes peuvent survenir lorsqu'un des hôtes intermédiaires dans la route choisie se déplace hors de la portée de transmission. Pour surmonter ceci, la maintenance de la route est effectuée en utilisant un système d'acquittement "hop-by-hop" (saut par saut) si bien que s'il existe un problème de transmission, celui-ci est répercuté à l'expéditeur de l'original et le système de découverte de route redémarrait.

Il est également souhaitable, dans un réseau informatique mobile, de s'assurer que la localisation courante du terminal mobile est connue, au moins pour les raisons mentionnées ci-dessus en ce qui concerne le routage des messages. Une méthode pour réaliser ceci est de s'assurer que la localisation courante de chaque terminal mobile est périodiquement communiquée à un centre de réseau. En conséquence, une carte dynamiquement mise à jour de la localisation de tous les terminaux mobiles peut être maintenue, laquelle peut être de plus utilisée pour déterminer le routage des messages. Des systèmes similaires sont connus, par exemple, à propos des réseaux et des systèmes de téléphone cellulaire. Un système idoine est décrit, par exemple, dans le brevet des Etats-Unis d'Amérique N° 5 612 703 qui concerne un système de communication cellulaire dans lequel la position d'une unité utilisateur choisie peut être déterminée en délivrant un signal de synchronisation à partir d'un noeud, en analysant un signal de réponse de synchronisation à partir de l'unité

utilisateur et en déterminant la position de l'unité utilisateur basée sur la transmission en aller-retour et le temps de réception.

La demande de brevet des Etats-Unis d'Amérique N° 08/614 068 également cédée à la Demanderesse et incorporée ici à titre de référence se rapporte à un terminal portable comportant une entrée de données et un afficheur de données et un détecteur de mouvement. Lorsqu'un déplacement est détecté, un contrôleur active un circuit approprié. Par exemple, lorsque le terminal est détecté comme étant dans une première orientation en position, une première fonction peut être exécutée tandis que lorsqu'il est détecté comme étant dans une seconde orientation en position, une seconde fonction est exécutée. On verra que cette possibilité peut être incorporée dans les terminaux selon la présente invention. Par exemple, elle peut être utilisée pour activer le terminal et le désactiver lorsqu'il est retiré du berceau et réintroduit dans ce dernier.

Une autre variante préférée encore de l'invention est représentée sur la figure 40. Dans ce cas, le terminal 710 est un client ultraléger s'appuyant sur le berceau pour la majeure partie de la charge de calcul et de traitement. En fait, le terminal 710 peut être représenté par deux composants de base, un moyen bloc-notes 7140 et un composant de communications sans fil 7142. Les détails exacts de ces composants ne sont pas représentés du fait qu'ils sont bien connus de l'homme de l'art. En effet, le moyen bloc-notes permet l'entrée des données dans le terminal et l'affichage des informations pertinentes au terminal. La charge de traitement au niveau du terminal est largement réduite à cette capacité de base d'entrée/sortie conjointement avec le contrôle du composant de communication sans fil 7142. Le composant de communication sans fil communique avec un composant correspondant 7144 prévu dans le berceau 712. En conséquence, l'entrée de données brutes au terminal 710 est transmise directement au berceau 712 sans nécessiter de traitement (autre que pour des raisons de communication) dans le terminal, ce qui conduit à une réduction concomitante des capacités de traitement et mémoire et ainsi la

consommation d'énergie par le terminal 710. Au lieu de cela, le volume de la capacité de calcul est maintenu au berceau, à savoir un processeur de données 7146 incorporant un espace mémoire approprié, un espace mémoire additionnel sous la forme de, par exemple, disques, un périphérique imprimante 7150, et des capacités de communication Ethernet 7152 permettant au berceau de faire partie d'un réseau sans fil plus large connecté, par exemple, à un hôte faisant partie lui-même d'un Intranet ou ayant un accès à l'Internet. En effet, par conséquent, le terminal portable 710 n'est rien de plus qu'un écran pour un ordinateur maintenu dans le berceau, les communications étant assurées via la liaison de communication sans fil en utilisant par exemple des protocoles radiofréquence ou infrarouges ou toute autre liaison appropriée. Plutôt que de communiquer directement avec le berceau, le terminal peut communiquer avec un ou plus d'un point d'accès le ou les plus proche(s), chacun étant lui-même en communication avec le berceau, ce qui permet une portée plus grande pour le terminal.

Un tel système est particulièrement utile, par exemple, pour des courtiers sur les places boursières ou dans des implémentations comparables. Les courtiers peuvent effectuer leurs transactions en utilisant les afficheurs qui tiennent dans la main, par exemple acheter/vendre des valeurs, maintenir à jour leurs portefeuilles d'actions courantes et toute autre transaction appropriée sans nécessiter pour la majeure partie du traitement de conditions requises en mémoire ou en énergie dans le terminal. Lorsque le terminal n'est pas requis il peut être retourné au berceau pour télécharger toute information supplémentaire nécessaire, pour la mise à jour de ses applications internes par le berceau et pour la recharge des batteries. En conséquences, un terminal utile, de faible poids et très mobile est proposé avec des applications d'arrière-plan qu'on peut attendre d'un ordinateur individuel pleine échelle ou équivalent.

Des implémentations supplémentaires encore envisagées pour le terminal consistent à prévoir un récepteur d'émissions radio AM/FM et/ou d'émissions de télévision dans le terminal. En conséquence, l'utilisateur peut

utiliser l'unité à des fins de divertissement aussi bien que pour exécuter des tâches à caractère informatique. Un tel terminal est représenté sur la figure 41. Le terminal comporte un écran d'affichage 7154 qui est non seulement conçu pour la présentation de textes et d'icônes mais également d'images vidéo. Le terminal incorpore alors de plus un clavier, par exemple un clavier 7156 totalement alphanumérique permettant l'exploitation du terminal soit en tant qu'assistant numérique personnel ou, conjointement avec une liaison sans fil, en tant qu'ordinateur individuel de bas de gamme. Le terminal 710 comporte de plus des contrôles additionnels 7158 permettant la sélection et/ou le contrôle d'une fonctionnalité télévision ou radio - par exemple volume/luminosité/canal, etc. En conséquence, un ordinateur portable est prévu lequel fait un usage additionnel de ses fonctions d'affichage en permettant à un récepteur de télévision d'être incorporé de même qu'à titre optionnel une possibilité radio.

Dans une variante de configuration qui peut être utilisée comme une amélioration ou adaptation des modes de réalisation mentionnés ci-dessus, ou comme un produit autonome, le terminal portable peut comprendre un "navigateur" ou "fouineur" Internet. Ceci permet une exploitation en conjonction avec la possibilité de client "ultralégers". En effet, le client, en dehors de ses bases de traitement d'affichage et de communication, comporte un logiciel navigateur qui permet à l'utilisateur, via la liaison sans fil vers le berceau, de parcourir l'Internet à la recherche d'applications et d'informations pertinentes. En utilisant cette possibilité de base, des applications et/ou des données peuvent être appelées sur demande et mémorisées dans une mémoire à court terme de bas de gamme aussi longtemps que nécessaire. Etant donné que des logiciels et des applications dédiés ne sont pas requis sur le terminal lui-même, les besoins en stockage et en traitement sont réduits de manière correspondante. Un affichage basé sur des icônes peut être incorporé dans le terminal pour permettre un accès convivial à l'Internet ou un accès Internet parmi les diverses options possibles d'un menu de sélection. Un tel système peut, par exemple, être implanté en utilisant comme base le langage

informatique Java (marque commercial) et le logiciel de support disponible auprès de la Société Sun Microsystems (marque commerciale).

Ces points sont d'une importance particulière à présent que les "gestionnaires" de pages Web de l'Internet ont migré d'un état d'entité statique visualisable en utilisant un navigateur vers des véritables applications ou "applets" ou appliquettes (composants programmatiques Java). Des systèmes ont été développés sur des réseaux locaux existants dans lesquels une fonction navigateur est introduite dans l'équipement matériel existant, formant un "sommet Web". Dans beaucoup d'applications, ceci comprend la première étape vers une migration vers un véritable "client léger" - il est envisagé que des "clients lourds" classiques sont d'une manière générale véritablement nécessaires pour des applications de traitement de gros volume à usage dédié. L'introduction de tels navigateurs permet à l'utilisateur d'accéder à l'Internet via l'Intranet pour télécharger des applications et des informations conjointement avec la diffusion correspondante d'informations. En plus des services de navigation le système peut supporter des services de messagerie, des services d'administration etc., comme cela est bien connu.

Comme décrit dans une certaine mesure par ailleurs, les avantages de ce système comprennent le contrôle de la sécurité, de la mise à jour au moment de l'exécution et des virus/falsifications. Les applications sont développées plus rapidement en raison du niveau d'utilisation auquel elles sont soumises et par conséquent des essais. Du fait que les applications sont stockées sur le serveur, l'administration peut être centralisée et les utilisateurs peuvent obtenir la mise à jour la plus récente de manière cohérente à travers le système. Le système peut supporter des applications multimédia de manière largement indépendante de la plate-forme cliente - par exemple un système du type téléphonique comportant un écran d'affichage, des assistants numériques personnels, des périphériques de téléviseurs ("boîtes à poser sur le poste"), des dispositifs de point de vente/kiosques, des capacités de divertissement, etc.

Les systèmes incorporant la capacité terminal/berceau décrit ci-dessus sont avantageux, par exemple dans des exploitations itinérantes telles que des systèmes d'emballage, des systèmes de pistage et des systèmes de course ou de messagerie. Un tel système est représenté de manière schématique sur la figure 42. L'utilisateur 7160 porte un terminal portable 710 comportant de préférence des capacités de scannage laser et de données à base de stylet comme décrit ci-dessus. Le terminal est rechargeable au niveau d'un berceau 712 monté sur le véhicule de l'utilisateur 7162 et peut également télécharger des informations.

Dans le mode de réalisation représenté le berceau est installé sur le tableau de bord bien qu'il puisse être installé sur le siège ou le plancher. Le berceau 712 est connecté à la batterie du véhicule 7164 ou, si nécessaire, à une source d'alimentation électrique auxiliaire. Cette connexion fournit la puissance de base à partir du véhicule vers le terminal pour la charge de la batterie et les fonctions de communication. La charge de la batterie commence automatiquement lorsque le terminal est introduit dans le berceau. Le berceau comporte de préférence un écran d'affichage indiquant que la batterie est en train d'être chargée, et lorsque la batterie est pleinement chargée, et une capacité de coupure est incluse si bien que l'énergie n'est plus soutirée du véhicule une fois que la batterie est pleinement chargée. Le terminal peut évidemment utiliser des blocs batterie modulaires permettant à un premier bloc batterie d'être en utilisation tandis qu'un second bloc batterie est en train d'être chargé.

Le berceau incorpore ou coopère avec un modem de réseau étendu sans fil monté sur un véhicule permettant la transmission à partir d'un point d'accès 7166 et à partir de ce dernier, lequel communique lui-même avec un hôte 7168. En conséquence, via l'hôte, une transmission de données sans fil bidirectionnelle est réalisée entre des capteurs d'opération distants et le personnel extérieur itinérant. Par exemple, les heures de prélèvement et de distribution, les ordres de mission, les rapports d'activité, les enregistrements

de transaction et toutes autres informations pertinentes peuvent être communiqués entre l'utilisateur 7160 et l'hôte 7168 rapidement et avec efficacité. En particulier, l'utilisateur 7160 peut introduire des informations dans le terminal 710 via le clavier ou via un scanneur ou un lecteur à stylet ou autre interface d'entrée appropriée et attendre le téléchargement des informations chaque fois que le terminal 710 est placé sur le berceau 712. En variante, le terminal 710 peut communiquer via une liaison sans fil avec le berceau 712 pour une transmission de données instantanée à un niveau approprié.

De préférence, le système incorpore une fonction "accusé de réception demandé" automatique, lorsque le terminal 710 est un terminal serveur Intranet. Un terminal serveur de ce type est décrit plus en détail dans la demande de brevet U.S. N° déposée le 28 mars 1997 également cédée à la Demanderesse et citée ici à titre de référence. Dans le fond, le terminal serveur comporte le logiciel serveur à l'intérieur du terminal lui-même permettant la création directe de fichiers Internet/"sites web" sans nécessiter de communications complexes avec un serveur distant. Dans une telle implémentation, le berceau 712 est prévu sur le véhicule 7162 comme représenté sur la figure 42 et l'utilisateur 7160 porte le terminal 710 jusqu'au destinataire du colis pour signer le colis en notant l'heure de livraison. Comme le terminal/berceau est un serveur (dans une variante d'implémentation le logiciel serveur peut être incorporé dans le berceau sans perte d'efficacité et avec une réduction dans la charge de traitement pesant sur le terminal), et le serveur peut communiquer sur un réseau étendu vers l'hôte ou le dépôt, une interface peut être prévue vers l'Internet permettant à l'expéditeur du colis de déterminer à tout moment si le colis a été déjà livré ou si une livraison a été tentée mais le paquet n'a pas été reçu. En conséquence, la société de livraison peut définir une capacité additionnelle pour attirer et satisfaire les consommateurs, donnant des informations instantanées via l'Internet sur l'état de toute livraison.

L'implémentation détaillée de ce qui précède peut être menée à bien de

diverses manières. Par exemple, l'expéditeur du colis peut accéder au site web de la firme de livraison et suivre ensuite la progression du colis particulier offrant un intérêt en utilisant, par exemple, un numéro de code attribué au moment de la commande de la livraison. Au même moment, la progression du colis peut être enregistrée par l'utilisateur ou l'agent de livraison en entrant les heures de livraison ou de tentative de livraison comparativement au code. Le code peut, par exemple, être lu par un scanneur prévu dans le terminal à partir des codes à barres prévus sur le colis, si approprié.

L'enregistrement ou journalisation de la progression du colis peut être amélioré davantage encore par le transfert d'enregistrement du colis à des stades intermédiaires entre l'expéditeur et le destinataire, par exemple, à chaque stade de la chaîne de dépôt. Le développement d'une liste ou table de routage est d'une importance particulière dans le cas général où la route exacte à prendre par le colis via la chaîne de dépôt n'est pas décidée au moment où la livraison est commandée. Ceci peut faciliter un double contrôle de la progression du colis. Il est préférable que la liste de routage spécifie les détails du camion de livraison final étant donné que ce dernier est plus facile à pister que les colis individuels. De préférence l'expéditeur paie une prime pour ce système de "accusé de réception instantané" si bien que la charge de transmission de l'état de chaque colis est réduite et ne nécessite pas d'être accessible sur une base de temps réel excepté lorsque l'on paie pour cela.

En se référant aux figures 43a 43b, une implémentation particulièrement utile du terminal portable est représentée pour une utilisation avec l'implémentation de livraison décrite ci-dessus. Dans de telles implémentations, il est souhaitable pour l'utilisateur d'avoir les deux mains libres pour la livraison de colis. En conséquence, un scanneur 7170 du type "pendentif" est utilisé, accroché autour du cou de l'utilisateur. Le terminal comporte une fenêtre scanneur 7172 orientée de manière à pointer dans la direction d'un colis maintenu à hauteur de taille par l'utilisateur. Un tel colis est représenté en 7174. Le terminal 7172 est ainsi capable de scanneur le colis et tous codes à

barres maintenus sur ce dernier avec une aisance optimale. Pour une manipulation simplifiée le terminal comporte de plus des contrôles 7176 et un écran d'affichage 7178 prévu sur une surface orientée vers le haut, si bien que l'utilisateur peut manipuler les contrôles et lire l'écran sans avoir à déplacer le scanneur pendentif. Le terminal 7170 peut de plus communiquer avec, ou être en interface avec, le berceau 712 de la manière décrite ci-dessus.

Comme mentionné ci-dessus, toutes utilisations peuvent être envisagées pour les terminaux du type décrit ci-avant, y compris des solutions du type gestion d'entrepôt et généralement logistique. Le système "client léger" décrit ci-dessus est particulièrement approprié à une incorporation dans les infrastructures existantes comprenant l'équipement matériel - systèmes PC, réseaux et outils de données, et l'équipement logiciel - bases de données, etc. qui sont déjà en place. Ceci s'applique à tous les domaines concernés du marché par exemple la vente au détail, la distribution ou la manufacture. Un tel système devra comporter de préférence un serveur central hébergeant une base de données appropriée conjointement avec des clients appropriés - par exemple des terminaux sans fil du type décrit ci-dessus intégrant une interface utilisateur graphique destinée à l'utilisateur. Le système apporte les avantages d'une exploitation en temps réel qui écourte le délai de livraison des instructions et fournit une implémentation optimale à la fois du personnel et du matériel, ce qui permet en même temps à la vérification d'avoir lieu sur une base immédiate et continue. L'information d'inventaire peut être datée et traitée en temps réel. Des niveaux peuvent être adaptés en conséquence et optimisés/minimisés. L'utilisateur saura automatiquement où les articles sont stockés et saura les localiser rapidement. En même temps la charge administrative est réduite. Tout ceci est réalisé sans modification coûteuse généralisée à l'infrastructure matérielle existante.

L'utilisation d'un terminal d'utilisateur basé sur des icônes signifie que le système peut être introduit rapidement et avec seulement une formation simple, mais le système peut également être étendu à des systèmes plus complexes

dont la planification "flottante", l'ordonnancement des ressources, la mesure de la productivité et l'estimation et la commande en temps réel des travaux. Comme l'inventaire est continuellement mis à jour, il n'y a pas de temps mort pour les travaux physiques d'inventaire. Des états de gestion, de données, d'inventaire, de stock et autres états pertinents, peuvent être obtenus à tout moment là encore en réduisant la charge administrative.

Un serveur central peut exécuter deux types de clients instantanément. En plus des terminaux sans fil exécuté via une forme quelconque de contrôleur de réseau par radio, des PC ou autres terminaux fixes peuvent également être reliés par câblage au système soit à la station de base, soit à distance. Des protocoles de communication d'interface standard peuvent être incorporés avec des architectures de réseaux standard pour réaliser un système fiable, interchangeable et adaptable de préférence relié à d'autres systèmes commerciaux selon les besoins.

Les solutions terminal/berceau du type décrit ci-dessus fournissent des stations de base compactes permettant la mise en réseau de données à vitesse élevée et en même temps la charge des batteries pour les terminaux. Les systèmes sont appropriés aux entreprises de transport et de logistique, au moyen de gestion d'entrepôts, à la sécurité publique, à la vente au détail et autres organisations appropriées. De préférence, au moment de l'initialisation, le berceau se met en marche et exécute un auto-diagnostic pour s'assurer du fonctionnement correct du système. La charge des batteries commence de préférence automatiquement lorsque le terminal est placé dans le berceau et des indicateurs tels que des LED (diodes électroluminescentes) peuvent être prévus sur le berceau pour indiquer quand l'alimentation est active et quand la charge a lieu. La transmission de données peut être réalisée rapidement et avec efficacité avec un hôte au moyen par exemple d'un modem utilisant des protocoles de communication standard. Des berceaux maîtres peuvent être connectés par exemple à un PC hôte ou autre chaîne de berceau. Des interfaces de préférence standard telles que RS232 et RS485 sont

prévues pour être utilisées avec une variété d'imprimantes et de périphériques portables.

Le système peut également être monté sur un véhicule lorsqu'approprié, pour les entreprises de transport et de course ou de messagerie, des utilitaires, des organisations de sécurité publique, des opérations de vente et d'entretien sur site et autres opérations appropriées. Le berceau comporte la capacité pour une charge de batterie "dans le véhicule" dans une communication sans fil bidirectionnelle. Il peut être installé par exemple sur le tableau de bord, le siège ou le plancher du véhicule et peut soutirer l'énergie à partir de la batterie du véhicule. Le système peut permettre une transmission de données sans fil bidirectionnelle entre des centres opérationnels distants et le personnel itinérant extérieur, ce qui permet une transmission rapide des prélèvements et des livraisons, des ordres de travaux, des rapports d'activité et des enregistrements de transaction.

Dans tous les cas on peut voir que la fourniture d'un client ultraléger réduit les conditions requises concernant le poids et l'énergie du terminal tenu dans la main, ce qui le rend encore davantage approprié aux utilisations portables envisagées.

Beaucoup des composants formant les modes de réalisation détaillés décrits ci-dessus, sont connus individuellement de l'homme de l'art et ne nécessitent pas une description détaillée ici.

On verra qu'il est fortement souhaitable de créer des clients qui sont "validés web", c'est-à-dire qui sont configurés pour offrir une capacité de connexion à l'Internet. Dans beaucoup de cas, il est souhaitable de retirer les terminaux basés sur un système d'exploitation antérieur utilisant, par exemple DOS et de les faire migrer plutôt vers, par exemple, HTML (hypertext mark-up language ou langage de description de documents hypertextuels). En se référant à la figure 58, la conception matérielle et logicielle pour un terminal optimisé web est représentée. Le modèle matériel présente les sous-systèmes principaux. Le modèle logiciel décrit comment la radio et le logiciel HTML

coexistent.

La portion numérique de la conception est assez simple. La CPU primaire 7400 (unité de traitement) peut être, par exemple, un National 486 SXF ou SXL (marque commercial). Il s'agit d'une CPU à haute intégration qui comporte une variété de périphériques dont un contrôleur LCD (affichage à cristaux liquides) 7402, un contrôleur DRAM (mémoire vive dynamique) 7404, des horloges, des ports séries, etc. Elle présente également un cache (antémémoire) codé sur puce et des capacités étendues pour une exploitation à faible puissance. Elle exécute des instructions à 32 bits en mode protégé 386 mais cependant ne peut pas exécuter DOS ou Windows (marque commerciale).

Il y a une seule puce 7406 à mémoire flash de 128 Ko contenant du code objet compressé. Lorsque l'unité démarre, le code est décompressé dans la DRAM 7404 et exécuté à partir de là. Les 128 kilo-octets contiendraient à peu près 256 kilo-octets de code objet 86. Ce code contient le microprogramme radio, les routines de configuration, et suffisamment de codes clients Web pour télécharger le code d'exécution réel à partir d'un serveur.

Il sera prévu une seule DRAM 1M x 16 7404 sur l'unité, fournissant 2 méga-octets de DRAM. Cela permet un fonctionnement à faible énergie et un auto-rafraîchissement.

L'interface scanneur 7408 sera, par exemple, le pré-programmé 8052 utilisé sur la carte décodeur actuellement disponible SE1222. Il ne sera pas fait usage de la carte décodeur elle-même mais juste des composants issus de cette dernière. Le 486 communiquera avec elle via son port série intégré. Un scanneur 7412, par exemple le SE1200, est également incorporé.

L'interface à la radio 7414 sera de préférence un simple port parallèle 8 bits bien qu'un port à la norme PCMCIA (architecture internationale de cartes-mémoire d'ordinateurs individuels) puisse être utilisé. Le module radio sera une capacité radio pure seulement ou une unité "kappa" passive ou de bas niveau qui ne comporte pas ses propres CPU, mémoire flash, mémoire vive RAM, etc.

Il existe deux options pour le support LCD. Le processeur 486SXF 7400 supporte un affichage allant jusqu'à 320 x 200. L'utilisation du 486SXF autorise une unité LCD de bas niveau sans contrôleur intégré. Si la version SXL est utilisée, le contrôleur LCD peut posséder son propre contrôleur.

Le clavier 7416 n'est constitué que de commutateurs de base. L'anti-rebondissement est réalisé par le processeur 486 7400.

La totalité du système fonctionne sur une alimentation unique de 5 volts.

La radio 7414 nécessite 5 volts de même que le processeur 486 7400. Ceci coûte quelques consommations électriques mais élimine la nécessité d'une alimentation 3,3 volts séparée, ce qui réduit ainsi les coût associés.

Le modèle le plus optimal en matière de coût est une configuration à deux cartes, la carte-mère et le module radio "Kappa". Sur une face de la carte-mère sont prévus les "touches" 7416, le LCD 7402 et des pièces quelles qu'elles soient peuvent être assemblées sur cette face. Sur l'autre face se trouvent le module radio 7414 (relié directement à la carte-mère) et le reste des pièces. L'objet dans sa totalité peut être de 1/2 à 3/4 de pouce en hauteur (1,27 cm à 1,905 cm), environ 2 pouces 1/4 en largeur (5,715 cm) et 4 à 6 pouces en longueur (10,16 cm à 15,24 cm). Le scanneur 7402 est également monté sur cette face. Le but est d'éliminer tous les câbles flexibles, ce qui réduit davantage les coûts. Le logiciel sur le modèle représenté sur la figure 58 est construit autour d'un petit noyau multitâche non préemptif qui fonctionne actuellement sur des cartes radio connues telles que la carte Spectrum 24 (marque commerciale) (disponible à partir des cartes radio produites par la Demanderesse). Il existe des tâches pour gérer l'interface utilisateur, Crux ou Cetus 418 , l'envoi et la réception, et le déplacement itinérant. Elles communiquent via des variables partagées et le passage de messages. Il existe une tâche en attente qui est la tâche à priorité la plus faible et elle peut être préemptée. Cette tâche forme la base d'une structure à boucle unique scrutée dans laquelle la pile de protocoles et le code d'exécution HTML existent.

Dans ce modèle, il existe une tâche qui opère au niveau "tâche". Elle exécute une série de tests qui peuvent se traduire par la survenance de quelques traitements. Des interruptions sont généralement autorisés à tout moment. La structure est représentée sur la figure 59.

On notera que les tâches peuvent être tout-à-fait complexes. Par exemple, le test peut consister à déterminer si un paquet a été reçu sur l'interface radiofréquence. Si un paquet a été reçu, celui-ci est passé à une pile de protocoles de réseau qui le traite.

Ce modèle logiciel a été utilisé avec succès sur les systèmes connus pour des pageurs et des modems, par exemple le Pageur et le Modem Symbol Technologies Spectrum 24. En conséquence, d'autres détails ne sont pas nécessaires ici. La version du pageur comprend le microprogramme radio, la pile de protocoles UDP (protocole de datagrammes d'utilisateur)/IP, l'interpréteur de protocole de pageur, et l'interface utilisateur du pageur tournant tous sur une CPU unique 80188. Le code d'exécution HTML a été conçu pour s'adapter à ce modèle d'interrogation à tâche unique.

Des stations d'accueil ou berceaux connus comportent des conditions requises de base diverses :

- Une compatibilité matérielle totale au niveau du signal à la connexion entre le berceau et l'hôte, si bien que l'hôte ne nécessite aucune modification, et une compatibilité matérielle totale au niveau du signal avec un port série présent sur le terminal.
- Une connexion à force d'insertion faible entre le terminal et le berceau permettant des retraits et des réinsertions fréquentes et de préférence illimitées.
- Une compatibilité matérielle totale au niveau des registres à l'intérieur du terminal avec le logiciel de communication existant, par exemple un logiciel de communication compatible IBM PC.
- Le support du "chaînage" de berceaux multiples à un port série hôte unique. Dans un mode de réalisation un berceau "maître" est prévu pour être

connecté à l'hôte, et supporte un grand nombre de berceaux "esclaves". Deux modes d'accès peuvent être supportés, un mode d'accès unique et un mode d'accès multiple. Dans le mode d'accès unique, un terminal à la fois reçoit un contrôle exclusif et le port série hôte et tous les terminaux subissent des résultats équivalents à "câble non connecté". Dans le mode d'accès multiple, tous les terminaux se voient octroyer un accès de réception au port série hôte mais le droit de transmettre n'est octroyé qu'à un seul terminal à la fois. Les deux modes doivent supporter des logiciels d'application standard sans modification en débit de l'occurrence du multiplexage.

- Le terminal/berceau doit pouvoir être implanté dans une configuration de véhicule comme décrit ci-dessus.
- Il est proposé d'utiliser une optique compatible IrDA (Infrared Data Association ou association des données infrarouges) pour l'interface à force d'insertion nulle afin de permettre l'utilisation du terminal avec des périphériques et des ordinateurs hôtes compatibles IrDA (non dédiés) aisément disponibles.

Des solutions aux divers points sont exposés ci-après.

Solution 1

Chaque terminal comprend deux paires d'optiques (deux transmetteurs et deux récepteurs) de même que chaque berceau. En conséquence, deux chemins de données en duplex intégral sont prévus. Chaque berceau contient un microprocesseur plus deux paires d'optiques par emplacement (pour loger un terminal). Dans ce modèle à quatre emplacements, un seul microprocesseur gère totalement les quatre emplacements. Le canal optique primaire entre le berceau et un terminal comporte la partie donnée d'une interface série à 9 broches totalement compatibles IBM PC, par exemple TXD (Transmission données), RXD (Données de Réception) et SG (Terre de Signalisation). Le canal optique auxiliaire entre le berceau et un terminal comporte des informations de contrôle (DTR(terminal de données prêt) et RTS (demande

pour émettre), des informations d'état, (DSR(poste de données prêt), DCD (porteuse de données détectée), CTS (prêt à émettre), RI (en lecture)) d'une interface série à 9 broches totalement compatibles IBM-PC et des informations de bus (BREQ(demande de bus) et BACK (reconnaissance de bus)).

L'interface de données est dirigée entre les optiques et le port RS-232 par le berceau. Les informations de contrôle et d'état sont communiquées sur le canal optique auxiliaire. A l'intérieur du terminal lui-même, des informations de contrôle, d'état et de bus sont utilisées pour produire les effets d'un mode d'accès unique ou multiple comme requis.

De multiples berceaux à 4 emplacements peuvent être chaînés ensemble (jusqu'à 4 berceaux physiques, pour 16 emplacements). Les signaux de bus (BREQ et BACK) sont passés comme des "jetons" depuis un berceau vers le suivant pour assurer le multiplexage inter-berceaux.

Le BIOS (système de base d'entrées/sorties) de l'ordinateur tenu dans la main implémente le protocole du berceau et fournit à la fois les services BIOS série compatibles IBM PC et un jeu de services BIOS série étendu propriétaire. Etant donné que peu, s'il en est, de programmes de communication série compatible IBM PC utilisent l'un et l'autre des jeux de services BIOS (au lieu d'aller directement au matériel), les communications via le berceau ne peuvent pas supporter des applications de communication standard. Etant donné que cela est également vrai pour ce qui est du port série physique, ceci ne constitue pas une difficulté particulière. Une version à emplacement unique de ces berceaux possède toutes les mêmes fonctionnalités des versions à quatre emplacements à l'exception qu'elle ne supporte pas le chaînage. Etant donné qu'un seul emplacement est présent et que la logique de chaînage n'est pas nécessaire, la conception matérielle est quelque peu plus simple. Les deux canaux optiques sont cependant gérés de manière identique, et le code BIOS du terminal est le même.

Une variante de configuration à emplacement unique est simplifiée et n'inclut pas la possibilité de chaînage ni d'interface optique. Un type modulaire

de connecteur (fiche téléphonique) peut être utilisé pour, soit assurer des communications série câblées (via un câble adaptateur) ou peut être utilisé comme connecteur d' "arrimage" du berceau, ce qui fournit un chemin câblé pour les deux canaux de données qui sont normalement optiques.

Pour améliorer la compatibilité IBM PC, une approche alternative peut être utilisée pour émuler l'interface de communication série IBM PC. Ceci implique le "pontage" de l'information de contrôle et d'état (conditionnée comme approprié sur la base de l'information de bus) entre le canal optique auxiliaire et les registres UART (circuit émetteur/récepteur universel asynchrone) "émulé". Ce pontage est réalisé en utilisant un mode spécial "Super-State" du microprocesseur F8680 de la Société Chips and Technologies dans le terminal. Etant donné que tous les logiciels dans ce dispositif s'exécutent en mode réel, la plupart des programmes de communication série compatibles IBM PC "se comportant bien" peuvent être utilisés.

Une solution pour réduire le coût des installations à berceaux multiples réside en l'élimination du microprocesseur de tous les berceaux sauf un (le "maître") dans chacune des chaînes comportant par exemple jusqu'à 60 berceaux.

Afin de satisfaire à toutes les exigences communes des berceaux (en particulier le chaînage), un procédé pour synchroniser l'accès au bus de berceaux à partir des multiples ordinateurs tenus dans la main, sans un processeur présent dans chaque berceau, est nécessaire. Le mécanisme peut être une variante de CSMA/CD (Carrier Sense Multiple Access/Collision Detection ou accès multiple par détection de porteuse et détection des collisions). Dans ce domaine, les processeurs présents dans les ordinateurs tenus dans la main eux-mêmes, avec la coopération du processeur unique se trouvant dans le berceau "maître", gèrent toute la commande requise du bus.

A la différence des variantes ci-dessus un seul canal de données est utilisé, libérant ainsi un UART sur le terminal et réduisant le nombre de paires optiques dans une combinaison terminale + berceau de 4 paires à 3 paires (2

transmetteurs et un récepteurs dans le berceau et 1 transmetteur et un récepteur dans le terminal). La troisième paire (un transmetteur dans le berceau et un récepteur dans le terminal) est requise pour permettre l'accès multiple par détection de porteuse et détection des collisions.

Pour autoriser l'interchaînage des différents berceaux, un commutateur sur le berceau "maître" est utilisé pour sélectionner le type d'émulation à supporter. Cette caractéristique permet à une chaîne de berceaux d'être placée à l'extrémité (la plus éloignée de l'hôte) d'une chaîne de berceau libre différente.

Pour assurer la compatibilité IBM PC, une approche similaire à celle décrit ci-dessus est utilisée pour émuler l'interface de communication série de l'IBM PC. Du fait qu'aucun canal de données directes n'est disponible (étant donné qu'il n'y a qu'un seul canal de données), les informations de données, de commande, et d'état doivent transiter sur le même canal. Ceci nécessite que l'émulation soit plus complète.

L'émulation est réalisée en utilisant du matériel de support dans l'interface ASIC (circuit intégré spécifique à des applications) et le contrôle du terminal. Ceci implique d'utiliser des déroutements des registres E/S (entrée/sortie) pour générer des NMI (interruptions non masquables) afin de permettre au logiciel de support du berceau d'émuler les résultats des accès par l'application aux registres UART. En utilisant un système ouvert basé sur le processeur 486, destiné à exécuter des logiciels en mode protégé tels que des extensions DOS et Windows (marque commerciale), le nombre potentiel d'interactions avec le logiciel de support du berceau est effectivement infini.

Dans une approche supplémentaire de berceau un type modulaire de connecteur (fiche téléphonique) est utilisé pour relier un câble adaptateur série à fixer au berceau. Le berceau, cependant, passe simplement les signaux au connecteur du port série du berceau. Etant donné que le port série est compatible IBM PC, le berceau l'est tout autant.

Lorsque le dispositif et son berceau ne supportent pas la charge interne

des batteries, le berceau est effectivement réduit à un "réplicateur de port" ou "câble étendu" et un socle ou support.

A titre de développement supplémentaire, il est proposé de faire une utilisation complète de la fonctionnalité IrDA, en particulier en utilisant la norme IrDA pour une communication sans fil et en utilisant les mêmes optiques IrDA que l'interface berceau pour éviter une duplication superflue de l'équipement matériel.

L'utilisation du mode d'émulation IrDA à 9 broches (appelé IrCOMM) appliqué aux piles de protocoles standard conçues pour ce type d'application permet au berceau d'être un convertisseur IrDA + IrCOMM à RS-232 avec multiplexage. Le multiplexage peut être relativement simple (c'est-à-dire le schéma de passage de "jetons" décrit ci-dessus), par conséquent il peut être implémenté sur le matériel comme ASIC (circuit intégré spécifique à des applications). En variante, le multiplexage pourrait être réalisé par le processeur requis pour exécuter la pile de protocoles IrDA et la couche IrCOMM.

L'addition d'un processeur à chaque berceau peut s'avérer encore plus efficace que l'introduction de différents jeux d'optiques sur chaque ordinateur tenu dans la main. Etant donné que les optiques IrDA sont semi-duplex, elles ne peuvent pas être utilisées aisément dans des modèles de berceaux constants centraux. L'utilisation des couches de piles de protocoles standard IrDA + IrCOMM est la méthode logique d'utilisation de ces optiques. Dans le berceau, étant donné que ces couches de protocoles doivent être converties en RS-232, un processeur est obligatoire.

A l'intérieur du terminal, l'émulation d'un port série compatible IBM PC est encore requise. Une approche similaire à celle décrite ci-dessus pourrait être d'"habiller" les interfaces IrDA et IrCOMM et de faire en sorte qu'elles ressemblent à un port COM standard. En variante, pour éviter les interactions logicielles que l'approche par émulation subit, il est possible d'ajouter un autre microprocesseur (tel qu'un 8031) à l'ordinateur tenu dans la main lui-même. Ce

processeur émulerait alors l'interface "matérielle" de l'UART et exécuterait les couches IrDA + IrCOMM. Cette approche éliminerait toute incompatibilité logicielle possible.

Il est de plus souhaité de développer un sous-système pour une utilisation dans un terminal qui soit conforme à la fois au standard externe tel que IrDA et à tous standards dédiés déterminés en interne. Le sous-système doit être capable de communiquer avec un autre standard interne ou des dispositifs de calcul équipés IrDA, avec un standard interne et/ou IrDA, et doit être approprié à l'utilisation dans l'implémentation de berceaux à connexion non physique. Ces berceaux doivent être capables d'assurer une émulation d'un port série complet RS-232 (avec et sans chaîne de berceau). Un système approprié couvre les fonctionnalités du sous-système, le matériel et le logiciel nécessaires à l'implémentation du sous-système (à la fois au niveau du terminal et des parties berceau) et la conception, l'implémentation, l'interface et les caractéristiques du sous-système identifient les conditions requises en matière de matériel et de logiciel fonctionnels pour ce qui concerne le sous-système complet standard interne/IrDA (à la fois le terminal et les parties berceau).

En se référant aux figures 44 à 51, la stratégie de communications sans fil destinée au système est basée sur deux technologies de communication physique fondamentales : IrDA (association de données infrarouges) et un standard interne propriétaire dédié agencé pour éliminer les câbles périphériques. IrDA est un standard pour systèmes ouverts. Pour les deux, les mêmes protocoles de communications (IrLAP, IrLMP, TinyTP et IrCOMM) seront utilisés afin de permettre une "inter-opération" transparente parmi les deux interfaces dans un système équipé des deux.

Les deux technologies peuvent être utilisées dans l'un quelconque ou l'ensemble des trois modes opérationnels suivants : mode "réseau aérien", point-à-multipoint, mode "émulation port série", point-à-point, et mode "berceau chaînable" multipoint à point. Le système assure une ou plus d'une des

configurations suivantes telles que représentées sur le Tableau 1 :

Nom de la configuration	Technologie utilisée	Mode utilisé
Berceau sur véhicule	Standard Interne et/ou IrDA	Emulation port série
Berceau au dépôt	Standard Interne	Berceau chaînable
Périphérique IrDA	IrDA	Réseau aérien

TABLEAU 1

Le fait de supporter les technologies de combinaison assure une connectabilité et une flexibilité optimale. IrDA assure des communications à largeur de bande relativement élevée (115,2 K Baud), à vue directe, à courte distance (en dessous du mètre),à faible consommation d'énergie, plus la compatibilité avec des périphériques de l'industrie au standard IrDA. Le standard interne assure des communications à largeur de bande plus faible (19,2 K Baud), omnidirectionnelles, à distance moyenne (3 à 6 mètres), à consommation d'énergie plus élevée. En fournissant une solution intégrée unique qui supporte les deux technologies et leur permet d'être utilisées de manière interchangeable, le système maximalise le potentiel de connectabilité sans fil.

La figure 44 représente un réseau IrDA "aérien" autorisant une communication sans fil IrDA entre un terminal 7180 et chacun d'un serveur équipé IrDA 7182 et une imprimante compatible IrDA 7184, une communication IrDA entre un portable du type "lap-top" ou autre 7186 et chacun d'un serveur 7182 et d'une imprimante 7184, de même qu'une communication IrDA entre le terminal 7180 et l'ordinateur portable 7186. Sur la figure 45 l'émulation du port série est représentée pour une technologie IrDA et/ou standard interne. Un terminal 180 communique avec un berceau 7188 par IrLAP, IrLMP, TinyTP et IrCOMM et l'une ou l'autre des technologies IrDA ou standard interne. Lorsque

la technologie IrDA est utilisée le berceau 7188 communique avec une passerelle 190 hôte/serveur via une interface RS-232 C. Lorsque le système utilise la technologie standard interne, le berceau 7188 communique avec une imprimante 7192 via une interface RS-232 C.

Le berceau chaîné au moyen de la technologie IrDA et/ou standard interne, représenté sur la figure 46 comporte une communication entre une pluralité de terminaux 7180 et des berceaux respectifs 7188 communiquant par l'une ou l'autre des technologies IrDA ou standard interne conjointement avec IrLAP, IrLMP, TinyTP et IrCOMM. Les berceaux communiquent les uns avec les autres via un bus de berceau et un berceau maître communique avec un hôte/serveur 7190 via une interface RS-232C.

Dans le modèle matériel "dans-le-terminal" avec IrDA et standard interne représenté sur la figure 47, une CPU (unité centrale de traitement) 7194 communique avec un multiplexeur 7196 de manière directe et via un UART 7198. Le multiplexeur 7196 communique via des pilotes IrDA 7200 avec les optiques IrDA 7202 et via une unité spécifique au standard interne 7204 avec une antenne 7206. Le terminal dans son ensemble est désigné par la référence 208.

En se référant à la figure 48, un berceau 7210 incorpore le modèle matériel d'émulation de port série avec IrDA et le standard interne coopère avec un microprocesseur 7212 comportant un stockage à mémoire vive RAM 7214 et un stockage à mémoire morte ROM 7216 dans son noyau ou partie centrale. Le microprocesseur 7212 communique avec l'hôte (représenté schématiquement en 7218) via un UART 7220, un pilote RS-232 7222 et un connecteur RS-232 7224. Le microprocesseur 7212 communique avec un multiplexeur 7226 directement et via un UART 7228. Le multiplexeur 7226 communique avec des optiques IrDA 7230 via des pilotes IrDA 7232. Le multiplexeur communique également avec une antenne 7234 via une unité au standard interne 7236.

En se référant à présent à la figure 49, un modèle de berceau chaînable

à technologies IrDA et standard interne comprend un microprocesseur comportant un stockage 7240 à mémoire RAM et un stockage à mémoire ROM 7242. Le microprocesseur 7238 communique avec une unité d'arbitrage 7244 directement et via un UART 7246. L'unité d'arbitrage arbitre entre la communication vers le berceau suivant éloigné de l'hôte et la communication vers l'hôte ou vers le berceau suivant en direction de l'hôte. L'unité d'arbitrage 7244 communique dans tous les cas avec un connecteur RS-232C dédié 7248a, 7248b via un pilote RS-232 dédié 7250a, 7250b. Le microprocesseur communique également avec un multiplexeur 7252 directement ou via un UART 7254. Le multiplexeur permet la communication avec une antenne 7256 via une unité au standard interne 7258. Le multiplexeur 7252 communique également avec des optiques IrDA 7260 via un pilote IrDA 7262. Le berceau est représenté d'une manière générale en 7264.

Le flux données logiciels/contrôle à l'intérieur du terminal est représenté schématiquement sur la figure 50. Les applications IrDA 7264 circulent via TinyTP, IrLMP, IrLAP 7266 ; UART réel 7268 et les optiques et pilotes IrDA ou unités au standard interne dans l'antenne 7270. Les héritages applicatifs dits "legacy applications" 7272 circulent via un UART émulé ; un IrCOMM 7276 et suivent ensuite le même chemin que les applications IrDA.

La figure 51 représente les données logiciels dans le flux de contrôle à l'intérieur du berceau. La circulation à partir d'IrDA vers le pont RS-232 7278 - le connecteur RS-232C 7280 s'effectue via le UART 7282 et les pilotes RS-232C 7284. Le flux de données IrDA vers le pont 7278 RS-232 - pilotes et optiques IrDA/unité standard interne et antenne 7286 s'effectue via IrCOMM 7288, TinyTP, IrLMP, IrLAP 7290 et UART 7292.

Beaucoup de dispositifs clients sont configurés pour recevoir une carte adaptateur leur permettant d'exécuter un accès réseau. Les composants de tels dispositifs et cartes adaptateurs sont bien connus de l'homme de l'art et ne seront pas décrits en détail ici. Un exemple d'un adaptateur réseau est le système vendu sous la dénomination commerciale SPECTRUM 24 par la

Demanderesse.

Dans des systèmes connus tels que celui représenté sur la figure 55, il est souvent souhaitable pour un dispositif client d'exécuter un accès aux fichiers du réseau en utilisant des clients du système de fichier du réseau (NFS) via des piles de protocoles du réseau ou des adaptateurs réseau. Pour accomplir ceci, le dispositif client 7350 doit de manière générale utiliser un emplacement PCMCIA pour maintenir la carte adaptateur 7352. De plus, divers composants logiciels, tels qu'un pilote de carte PCMCIA 7354, une pile de protocoles 7356, et un client du système de fichier du réseau 7358, doivent tous être présents et en exécution sur le dispositif client.

Pour de petits dispositifs clients à coût réduit, la mémoire de masse secondaire nécessitée pour maintenir ces composants logiciels peut être importante comparée à la capacité mémoire de masse secondaire totale du dispositif. De plus, la mémoire vive RAM requise pour exécuter ces composants logiciels peut être importante comparée à la capacité RAM totale du dispositif. Finalement, la puissance de traitement requise pour exécuter ces composants logiciels peut être importante comparée à la puissance de traitement totale du dispositif.

Etant donné que beaucoup de ces composants logiciels peuvent nécessiter d'être spécifiques au dispositif client, la configuration et le déploiement du programme Network File Access ou accès aux fichiers du réseau sur divers dispositifs clients peuvent être difficiles. De plus, la mémoire de masse secondaire requise pour maintenir les composants logiciels peut nécessiter l'utilisation d'un second emplacement PCMCIA, ce qui peut ne pas être pratique ou souhaitable en fonction des capacités du dispositif client. Finalement, la configuration et la maintenance d'un réseau peuvent être très difficiles et consommer du temps.

Le dispositif client et la carte adaptateur réseau se rejoignent via une interface PCMCIA 7362. Dans le cas de la carte adaptateur existante 7352, le logiciel consiste dans un programme de commande radio autonome 7360 avec

une interface 7352 vers le pilote ODI (Open Datalink Interface ou interface de liaisons à protocoles de transport multiples) ou NDIS (Network Device Interface Specification ou spécification d'interface d'élément de réseau) 7355 prévu dans le dispositif client.

L'invention telle que représentée sur les figures 56 et 57 incorporent la fonctionnalité de la carte adaptateur réseau 7370 dans un système qui comprend également la ou les pile(s) de protocole réseau 7372 et le ou les client(s) NFS 7374. Le système entier est ensuite conditionné en lot sur une carte PCMCIA qui émule une carte au standard PCMCIA ATA (pour AT attachment ou environnement AT). Ceci permet à tout dispositif client 7376 qui est capable d'adresser une carte PCMCIA ATA, d'accéder de manière transparente à des fichiers à partir d'un serveur de fichiers. Etant donné que la seule interface entre le dispositif client et le système est l'interface 7378 ATA/IDE (gestion de périphérique à électronique intégrée), le dispositif client nécessite d'avoir seulement un pilote 7380 ATA/IDE et non pas un pilote adaptateur réseau, une ou des pile(s) de protocole réseau, et un ou des client(s) NFS.

La carte d'accès fichiers 7370 est constituée d'un processeur, d'une mémoire RAM, d'un flash et d'une radio classique 7388 par exemple du type vendu sous la dénomination commerciale SPECTRUM 24 par la Demanderesse. Cette carte est à la base du même modèle que la carte adaptateur existante.

La différence fondamentale dans la solution proposée réside dans le logiciel tournant sur le processeur 7382. L'interface vers le pilote du dispositif client ODI ou NDIS est remplacée par une interface directe vers un pilote ODI 7390, une ou plusieurs pile(s) de protocole 7372 et un ou plusieurs client(s) NFS 7374, tous se trouvant à l'intérieur de la carte d'accès fichier 7370 elle-même. Tous ces composants logiciels tournent ensuite sur le processeur 7382 dans la carte d'accès fichier 7370. Le logiciel nécessaire à l'émulation d'une unité de disque IDE est présent pour assurer l'interface avec le dispositif client.

Le logiciel comporte de plus un programme de commande radio 7394 inchangé par rapport aux programmes de commande radio standard excepté qu'au lieu d'une interface avec le pilote ODI dans le système client via l'interface PCMCIA 7378, il interface directement le pilote ODI 7390 s'exécutant dans le même processeur à l'intérieur de la carte d'accès fichier 7370. La ou les pile(s) de protocole 7372 et le ou les client(s) NFS 7374 se chargent sur le sommet du pilote ODI 7390 d'une manière similaire à celle dont il ferait sur un dispositif client. Le logiciel contrôleur ATA/IDE 7396 doit émuler l'interface ATA/IDE 7378 et utilise les services du ou des client(s) NFS 7374 pour accéder aux fichiers sur le serveur NFS en réponse aux requêtes du client via l'interface ATA/IDE 7378 pour accéder au disque émulé.

Afin de supporter des piles de protocoles 7372 et des clients NFS 7374 multiples, la carte d'accès fichier 7370 doit, soit comporter des piles de protocoles et des clients NSF multiples, avec un mécanisme pour sélectionner celui à utiliser, soit posséder un moyen pour charger la pile de protocoles et le client NFS souhaités.

La carte d'accès fichier 7370 comporte de plus un matériel radio 7395 approprié.

Les pilotes de carte adaptateurs classiques nécessitent que certains paramètres (tels que Net ID ou identificateur de réseau) soient spécifiés. Un mécanisme doit être fourni pour spécifier ces paramètres. De plus, les piles de protocoles 7372 et les clients NFS 7374 nécessitent typiquement des paramètres de configuration (tels que l'adresse IP, le nom de connexion, le mot de passe, etc.). Un mécanisme est prévu pour spécifier cette information.

De nombreuses solutions aux problèmes de chargement/mise à jour des piles de protocoles 7372 et des clients NFS 7374, et à la définition des informations de paramètre peuvent être élaborées. Etant donné que l'implémentation matérielle contient une mémoire flash 7386, celle-ci constitue l'endroit évident pour stocker ces types variables de données. Un procédé consiste à utiliser une partie de la mémoire flash 7386 pour émuler un disque

(de la même manière que celle utilisée par une carte ATA Flash normale). Ce disque contient la pile de protocoles 7372 et des fichiers clients NFS 7374 standard, de même que les fichiers de configuration (NET, CFG, PCTCP.INI, etc.) utilisés pour configurer les piles de protocoles et les clients NFS. Tous ces fichiers sont localisés dans le répertoire racine ou dans des sous-répertoires de l'unité ATA, et tous sont physiquement stockés dans la mémoire flash 7386 de la carte d'accès fichier 7370. Pour reconfigurer ou recharger les piles de protocoles 7372 et/ou les clients NFS 7374, le dispositif client n'a besoin que d'éditer ou de copier des fichiers à l'intérieur de la mémoire flash via le pilote ATA.

Afin d'autoriser un accès à la fois à la mémoire flash locale 7386 de la carte d'accès fichier 7370 et aux fichiers se trouvant sur le serveur de fichiers utilisant la même interface, la contrôleur ATA 7396 de la carte d'accès fichier doit fusionner les fichiers à partir du serveur de fichiers sur le disque qu'il est en train d'émuler. La manière la plus simple pour réaliser ceci est de traiter chaque système de fichier monté via le client NFS 7374 comme un sous-répertoire de l'unité émulée. En limitant les noms du système de fichier à 8 caractères, le nom du système de fichier peut également être le nom du sous-répertoire (hors de la racine de l'unité ATA émulée) qui est utilisé pour accéder à ce système de fichier.

Lorsque les accès sont effectués sur les secteurs contenant l'information de répertoire pour un système de fichier, le contrôleur ATA 7396 doit obtenir l'information de répertoire courant à partir du système de fichier via le client NFS correspondant 7374, construire les secteurs du répertoire en conséquence, et les rendre disponibles au dispositif client (via l'interface ATA 7378). Lorsque les accès sont effectués sur des secteurs de données référencés par des secteurs de répertoire, le contrôleur ATA 7396 doit obtenir les données pour les fichiers consultés via le client NFS 7374, créer les secteurs de données, et les rendre disponibles pour le dispositif client.

Si la carte d'accès fichier 7370 a une mémoire flash 7386 suffisante, elle

peut effectuer une lecture sur des secteurs caches de répertoires ou de données si bien que des accès fréquents par le dispositif client s'exécute plus rapidement. Ceci doit être équilibré avec soin pour échanger un accès rapide avec des données précises. Etant donné que les fichiers dans le système de fichiers monté peuvent être accessibles par d'autres clients, il n'est pas garanti qu'ils restent valides une fois qu'ils ont été mis en cache dans la carte d'accès fichiers 7370. Des réglages destinés à permettre au dispositif client de contrôler le comportement de la logique de cache peuvent être nécessaires. Cette information peut être stockée dans un fichier de configuration conjointement avec les autres informations de paramétrage.

Des problèmes de sécurité peuvent survenir en raison de la nécessité de stocker les noms de connexion, les mots de passe, etc., à l'intérieur de la mémoire flash 7386 de la carte d'accès fichiers 7370. Comme cette information voyage à présent avec la carte et, étant portable, peut représenter une atteinte à la sécurité, il est possible d'utiliser diverses techniques d'encryptage pour sécuriser les fichiers de configuration contre une exploration non autorisée. La carte d'accès fichiers 7370 nécessite de faire une copie temporaire, non encryptée, de ce fichier pour l'utilisation de la ou des pile(s) de protocoles 7372 et du ou des client(s) NFS 7374 alors qu'elle est en train de démarrer. Une fois qu'elle tourne, cette copie temporaire peut être supprimée. Aussi longtemps que cette copie temporaire n'est pas accessible au dispositif client, elle ne représente pas une atteinte à la sécurité.

Des problèmes d'intégrité des données peuvent se poser en raison de la nécessité de soumettre la carte d'accès fichiers 7370 à un cycle de mise sous tension lorsqu'elle est utilisée dans des dispositifs clients portables. De plus, chaque fois que la carte est enlevée du dispositif client, elle perd son énergie. La conception du contrôleur ATA 7396 doit assurer qu'une écriture est complètement achevée ou pas du tout. Ceci est une contrainte de conception standard des contrôleurs ATA basés sur une mémoire flash. La carte d'accès fichiers 7370 doit prendre cette précaution une étape plus loin. Une écriture ne

peut être considérée comme étant complète jusqu'à ce qu'elle ait été propagée avec succès jusqu'au serveur de fichiers. Toute mise en cache locale exécutée à l'intérieur de la carte d'accès fichiers 7370 doit être synchronisée avec ce comportement d'écriture tout ou rien.

La carte d'accès fichiers 7370 doit établir/réétablir des connexions et monter/remonter des systèmes de fichiers automatiquement chaque fois que la tension est appliquée à la carte. Ceci peut prendre une durée de temps importante et l'accès à la carte peut nécessiter d'être retardé jusqu'à ce que ce traitement soit achevé. Ceci est déjà possible avec des cartes ATA, lorsque le temps nécessaire pour mettre en rotation un disque dur peut être important. L'interface 7378 ATA/IDE fournit le mécanisme nécessaire pour retarder l'accès à la carte jusqu'à ce qu'elle soit prête. De plus, lorsque des accès aux données de la carte nécessitent une activité NFS pour obtenir les données, des accès individuels peuvent être tout-à-fait lents. Les mêmes mécanismes décrits précédemment peuvent être appliqués pour désactiver le dispositif client jusqu'à ce que les données soient disponibles.

Etant donné que la carte d'accès fichiers 7370 doit contenir essentiellement le même équipement matériel et le même microprogramme en mémoire morte comme carte adaptateur standard, elle pourrait être aussi conçue pour opérer comme une carte adaptateur de ce type. Ceci nécessiterait, évidemment, que le pilote de carte d'adaptateur et les piles de protocoles d'être présentes dans le dispositif client. Ceci permettrait à la carte d'être utilisée soit comme une carte d'accès fichiers soit comme une carte adaptateur standard de manière interchangeable (bien que non simultanée).

Il est également possible de créer une couche de communication personnalisée entre le dispositif client et la carte d'accès fichiers 7370 qui remplace les couches réseaux standard qui seraient normalement présentes sur le dispositif client. Etant donné que la carte d'accès fichiers 7370 contient le pilote ODI 7390 et la ou les pile(s) de protocoles 7372, il n'est pas nécessaire de dupliquer ces composants dans le dispositif client. L'interface d'application

vers le réseau peut être ré-implémenté pour utiliser cette couche de communication personnalisée, au lieu de parler directement à la ou aux pile(s) de protocoles 7372. Le résultat final est que les applications du dispositif client peuvent utiliser des services réseaux sans des piles de protocoles 7372 réelles s'exécutant sur le dispositif client. Des interfaces d'application appropriés seront bien connus de l'homme de l'art et ne seront pas décrites davantage ici. Par exemple, les interfaces disponibles sous les marques commerciales BERKELEY SOCKETS ou WINSOCK seraient appropriées.

En utilisant l'approche ci-dessus, il est alors possible de permettre un accès direct aux services réseaux (par exemple via des interfaces d'application) concouramment avec des accès aux fichiers du serveur de fichiers. Ceci nécessiterait, évidemment, que la carte d'accès fichiers 7370 possède des capacités de calcul suffisantes pour supporter une émulation de l'interface ATA/IDE 7378 et supporte la couche de communication personnalisée en même temps.

L'agencement décrit ci-dessus aboutit à de nombreux avantages dans les applications. Par exemple, l'invention fournit le support pour l'accès sans fil à des fichiers sur des serveurs de fichiers à partir de tout dispositif client tel qu'un emplacement PCMCIA et supporte l'accès à des cartes ATA. Les piles de protocoles spécifiques au dispositif client ou des clients NFS ne sont pas nécessaires. En même temps, une configuration simplifiée pour l'accès au système de fichiers NFS est autorisée. Une fois que la carte a été configurée pour être utilisée avec des piles de protocoles d'un jeu donné, des clients NFS et des systèmes de fichiers, elle peut être déplacée librement de dispositif client à dispositif client sans nécessiter aucun changement dans la configuration requise. Etant donné que ni pile de protocoles ni client NFS n'ont besoin d'être présents sur le dispositif client, des exigences réduites en matière de mémoire et de stockage secondaire pour les dispositifs clients sont atteintes, ce qui permet des clients encore plus légers. Les piles de protocoles et les clients NFS s'exécutent dans le processeur de la carte d'accès fichier plutôt que dans

le dispositif client, ce qui assure une performance cohérente à travers les multiples dispositifs clients. Il y a également une réduction potentielle dans le nombre d'emplacements PCMCIA nécessaires pour supporter une application donnée. Etant donné que tous les composants logiciels requis pour supporter l'accès au serveur de fichiers sont présents sur la même carte, beaucoup de dispositifs clients peuvent éviter l'utilisation de cartes de mémoires PCMCIA additionnelles. Ceci permet aux dispositifs clients munis seulement d'un emplacement unique disponible d'accéder à des fichiers de serveur de fichiers avec succès.

Selon un autre aspect, il est proposé un dispositif intégré à mémoire destiné à être utilisé dans un système intégré à base de PC autorisant une solution de stockage standard unique supportant directement une mémoire exécutable (par exemple le BIOS) et une mémoire secondaire (par exemple un disque) avec une possibilité de mise à niveau sur site, convenant à l'utilisation sur tous les systèmes de calcul intégrés à base de PC. Ci-après le dispositif à mémoire intégrée sera simplement appelé le Dispositif et le système de calcul intégré à base de PC sera simplement appelé le Système.

Une implémentation de la présente invention se rapporte à un "serveur portable", c'est-à-dire, un terminal mobile comportant une capacité de serveur tel que décrit plus en détail dans la demande de brevet des Etats-Unis N° déposée le 28 mars 1997 et également cédée à la Demanderesse, laquelle est citée ici à titre de référence. Comme représenté sur les figures 60a, 60b, 61a et 61b, une capacité de serveur web peut être implémentée dans une carte enfichable, par exemple une carte PCMCIA. Un dispositif mobile 7500 qui peut être tout dispositif mobile approprié tel qu'un terminal du type décrit ci-dessus, un assistant numérique personnel, une caméra numérique, etc., comportant un port 7502 d'interface de carte, par exemple un emplacement PCMCIA ou de mémoire flash compacte loge une carte 7504 à l'interface. La carte 7504 comporte des capacités de serveur par exemple pour l'Internet ou la toile d'araignée mondiale (worldwide web) et le système agit ainsi comme un

serveur web transparent. En se référant plus en détail à la figure 60b, la carte 7504 comporte une interface PCMCIA ou autre interface appropriée à la communication avec le dispositif mobile 7500, la mémoire flash 7508 et un contrôleur ATA 7510 (AT attachment ou environnement AT) utilisés pour implémenter le disque dur. La mémoire 7508 est destinée au stockage des données produites par le dispositif mobile et la carte 7504 comporte de plus une CPU (unité centrale de traitement) 7512 qui accède aux données et exécute une routine du logiciel serveur web. La CPU 7512 est configurée pour exécuter un module de communication radio appropriée 7514, par exemple du type disponible auprès de la Demanderesse sous la dénomination commerciale "SPECTRUM 24 RADIO". La CPU 7512 est également configurée pour gérer les protocoles TCP/IP. Le dispositif mobile 7500 portant la carte 7504 est ainsi capable de communiquer avec un point d'accès proche approprié et ensuite vers un PC client par voie aérienne ou une antenne 7516.

En conséquence, le PC client peut afficher une page web représentative des données stockées dans la mémoire du dispositif mobile comme souhaité. La carte 7504 peut ainsi convertir tout dispositif, comme décrit ci-dessus, en un serveur pour le web. Ceci est représenté plus en détail sur les figures 61a et 61b. Le dispositif mobile 7500 collecte des données à un point de collecte de données 7518 qui peut être, par exemple, une caméra numérique à image fixe ou vidéo, un lecteur de codes à barres, un microphone ou un point d'entrée de données tel qu'un clavier. Les données sont stockées, par exemple dans la carte 7504 en utilisant le contrôleur ATA 7510. La carte 7504 coopère avec le dispositif 7500 pour agir comme serveur web transparent et transmet les données à partir de la carte 7504 via l'antenne 7516. La transmission est reçue par une antenne 7520 vers un point d'accès 7522 connecté à l'ossature ou câblage principal Ethernet 7524. Connecté au câblage principal 7524, se trouve un client PC 7526. En conséquence, lorsque, par exemple, un navigateur ou "fouineur" du worldwide web de tout type approprié est exécuté sur le PC client 7526 et appelle la "page web" au dispositif mobile envoyant une requête HTTP

(Hyper Text Transfer Protocol ou protocole de transfert de documents hypertextuels) pour l'adresse uniformisée de ressource (URL) la requête est routée via le câblage principal 7524 et agit comme point 7522 vers le serveur web transparent formé par le dispositif 7500 et la carte 7504. Les données collectées au dispositif mobile sont renvoyées au point d'accès en réponse à la requête et la page web est acheminée vers le PC client 7526.

Concernant les conditions requises physiques du Dispositif :

Le Dispositif est implémenté dans un ou deux modes de réalisation physiques : Modulaire et Composant.

Le mode de réalisation Modulaire du Dispositif consiste en une carte circuit unique autonome (ou équivalent) qui peut être montée sur une carte circuit (ou équivalent) à l'intérieur du Système. Le sous-système implémenté par le mode de réalisation Composant sera interfacé avec le reste du système via le jeu de signaux d'interface décrit ci-après.

Des modes de réalisation Modulaire du Dispositif sont en interface avec le Système via un connecteur standard de type approprié. Ce connecteur fournit le jeu de signaux d'interface décrit ci-dessous. De plus, ce connecteur est de coût réduit, à profil bas, et très protégé des chocs et des vibrations. Ce connecteur n'est pas destiné à être utilisé pour des introductions et des retraits fréquents étant donné que cet aspect concerne des applications intégrées inamovibles.

Tous les modes de réalisation du Dispositif sont en interface avec le Système via le même jeu de signaux d'interface. Ces signaux représentent un sous-jeu des signaux de bus ISA (Industry Standard Architecture ou architecture des normes industrielles), le ou les signal(aux) additionnel(s) requis pour l'interface avec une EPROM (mémoire morte programmable électriquement) BIOS standard, plus des signaux utilisés pour contrôler les options du Dispositif. Le jeu de signaux requis est listé ci-après :

- Signaux de puissance, par exemple
  +3,3 Vcc,

+5 Vcc,

+12 Vcc,

Terre pour diverses applications.

- Des signaux de commande, par exemple horloge, transferts de données, adresse valide, données valides, état d'attente zéro pour cycle de bus courant, signal d'horloge oscillant, remettre à zéro-retourner à l'état par défaut et préparer des opérations XIP (protocole pour carte PCMCIA) et Disque. Si nécessaire, le Dispositif peut commander cette ligne pour maintenir le système dans un état de réinitialisation jusqu'à ce que sa propre réinitialisation soit complète, le dispositif E/S (entrée/sortie) lise la commande d'échantillonnage,

le dispositif E/S écrive la commande d'échantillonnage,

la mémoire lise la commande d'échantillonnage,

la mémoire écrive le signal de commande d'échantillonnage indiquant que le cycle courant E/S ou mémoire EPROM doit être prolongé. Le signal doit être utilisé conformément aux exigences de performance décrites ci-après, signalé au Système qu'un cycle mémoire EPROM à 16 bits est requis. Ce signal ne doit pas être utilisé par le Dispositif à moins que le signal USEMEM 16 soit présent indiquant que le Système est capable de et souhaite participer aux cycles mémoire EPROM à 16 bits.

Indiquer au Système qu'un cycle E/S 16 bits est requis. Ce signal ne doit pas être utilisé par le Dispositif à moins que le signal USEIO16 soit présent indiquant que le Système est capable et souhaite participer aux cycles E/S 16 bits.

- Des signaux de commande EPROM par exemple :

Indiquer que le Système est en train d'accéder à la section XIP du Dispositif. Ce signal est généré par la logique de décodage d'adresse dans le Système et est présenté après que les lignes d'adresses appropriées sont validées. Indiquer au Système que l'accès à la section XIP est achevé et que les données de la section XIP sont disponibles sur les lignes de données. Si ceci n'intervient pas à l'intérieur d'un cycle unique, le Dispositif doit utiliser le

signal IOCHRDY pour démarrer des cycles d'attente prolongée.

Indiquer au Système que la section XIP est prête pour un accès par le Système. Ce signal sera activé après que le processus d'initialisation institué par le signal RESET a été achevé. Le Système n'accédera pas à la section XIP suivant RESET jusqu'à ce que ce signal soit activé par le Dispositif.

Indiquer que le Système accorde la permission au Dispositif de mettre à jour le contenu de la sous-section IPL de la section XIP. Lorsque ce signal n'est pas présent, le contenu de la sous-section IPL ne doit pas être modifié (même si les commandes appropriées sont envoyées au Dispositif par le Système).

- Des signaux de commande d'option de Dispositif comprenant :

Indiquer que le système souhaite que le Dispositif entre dans son état de puissance le plus faible aussitôt que possible. Les exigences en matière de consommation d'énergie et de synchronisation sont décrites ci-après. Une fois dans l'état de veille, le dispositif ne nécessite pas de supporter des accès XIP ou Disque jusqu'à ce que ce signal soit désactivé et que le Dispositif ait repris les opérations (indiquées par les désactivation du signal SUSPSTATE). Indiquer au Système l'état de veille courant du Dispositif. Si le Dispositif est actuellement à l'état de veille, ce signal sera actif, sinon il sera inactif.

Indiquer que le système accorde la permission au Dispositif d'utiliser la pleine puissance à volonté. Des opérations à pleine puissance exécutées à la discrétion du Dispositif (par exemple des opérations d'arrière-plan), ne sont autorisées que lorsque ce signal est actif. L'utilisation de la pleine puissance par le Dispositif est toujours permise durant une opération de mise à jour XIP ou d'écriture disque explicitement demandée, indépendamment de l'état de ce signal.

Indiquer au Système que le Dispositif utilise actuellement la pleine puissance. Ce signal ne nécessite d'être positionné que lorsque le signal précédent indique que le Dispositif est autorisé à utiliser la pleine puissance en arrière-plan et quand le Dispositif est réellement en train de le faire. Ce signal peut également, mais non nécessairement, être utilisé pour signaler l'utilisation

de la pleine puissance pendant une opération de mise à jour XIP ou d'écriture Disque explicitement demandée.

Signal de sélection de puce pour IDE au destinataire.

Signal disque actif/esclave présent utilisé par un dispositif IDE esclave pour acquitter le dispositif IDE maître durant l'initialisation.

Signal utilisé par le Système ou le montage de la configuration externe pour indiquer que le Dispositif peut être reconfiguré et que les alimentations 5 et 12 volts sont disponibles. La configuration du Dispositif ne sera pas changée (même si les commandes appropriées sont envoyées au Dispositif par le Système) à moins que ce signal soit présent.

Indiquer que le Système est capable d'exécuter des cycles E/S 16 bits et veut interagir avec le dispositif en utilisant de tels cycles. Le Dispositif décide s'il faut utiliser des cycles 8 et 16 bits et indique le choix au Système via le signal approprié.

Indiquer que le Système est capable d'exécuter des cycles mémoires EPROM 16 bits et veut interagir avec le Dispositif en utilisant de tels cycles. Le Dispositif décide s'il faut utiliser des cycles 8 et 16 bits et indique le choix au Système via le signal MEMCS16.

- Des signaux d'adresses, par exemple

Pour adresser [jusqu'à 256 K de] la section XIP du Dispositif, le Système.

Si une implémentation du Dispositif choisit d'étendre la taille de la section XIP au-delà de 256 Kilo-octets, des bits d'adresses additionnelles peuvent être utilisés pour adresser la mémoire supplémentaire. Le Dispositif peut supposer que tous les bits d'adresses sont valides lorsque le signal approprié est présent. La conception d'un système utilisant le Dispositif peut par conséquent assurer que la génération du signal approprié tienne compte des bits d'adresses supérieurs. Si un Système devait générer ce signal chaque fois que les bits d'adresses inférieurs contenus dans les valeurs de droite, sans tenir compte des bits d'adresses de rang supérieur, alors le Dispositif pourrait

accéder à une mémoire autre que la section XIP visée.

- Des signaux de données, par exemple

Lorsque le signal approprié indique le besoin d'un cycle mémoire 8 bits, alors seulement une première plage est utilisée. Si les signaux indiquent le besoin d'un cycle mémoire 16 bits, alors la première plage est utilisée, mais la dernière plage ne peut être utilisée qu'après que les signaux ont indiqué la disponibilité des lignes de données supérieures.

- Signaux d'interruption, par exemple

Signal IRQ supporté par le Dispositif. Il n'est utilisé que pour une émulation d'interface IDE. Ce signal peut être connecté à toute ligne IRQ du Système disponible, mais pour des raisons de compatibilité, il est suggéré qu'il soit attaché à l'interruption standard du disque dur.

Toutes les tensions de programmation requises pour accéder à la mémoire à l'intérieur du Dispositif sont générées à l'intérieur du Dispositif à partir, soit d'une tension d'alimentation unique de 3,3 V ou d'une tension d'alimentation unique de 5 V. Un système n'a besoin de fournir que l'une de ces tensions d'alimentation mais peut optionnellement fournir les deux. Le Dispositif doit être capable d'obtenir sa puissance d'exploitation normale à partir de l'une ou l'autre des alimentations. Ces tensions d'alimentation sont fournies via l'interface du Dispositif standard décrit ci-dessus.

Le Dispositif obligera son exploitation à se conformer à l'un de trois états de puissance comme déterminé par les deux signaux de commande d'option du Dispositif décrit ci-dessus. Par exemple, le signal peut indiquer que le Dispositif devrait entrer dans son mode de puissance réduite et ne pas répondre aux accès à la section XIP ou Disque ou que le Dispositif est libre d'utiliser la pleine puissance à sa propre discrétion.

En l'absence de l'un et l'autre des signaux, le Dispositif supportera toutes les opérations d'accès, mais devra exécuter des opérations à puissance plus élevée (telles qu'un effacement) uniquement pendant la durée d'une opération explicitement demandée par le Système (par exemple une mise à jour XIP ou

une écriture disque).

Si le Dispositif supporte des opérations d'arrière-plan (déplacement de blocs, effacement, etc.) il peut n'utiliser la pleine puissance que pendant des opérations d'arrière-plan lorsque le signal approprié est présent et doit achever de telles opérations d'arrière-plan si le signal est désactivé.

Le Dispositif doit être capable de changer d'états en quelques millisecondes à partir de l'instant où le signal change. Le Dispositif doit aviser si oui ou non il est dans un état de veille via le signal approprié. Le Dispositif doit informer de toute utilisation d'arrière-plan de la pleine puissance via le signal approprié.

Le Tableau 2 décrit les relations entre les signaux de commande de puissance et d'état et les limitations de puissance pour chaque état :

Nom de l'état	Entrer signal d'état de puisance réduite	Signal d'état de veille actuel	Pleine puissance au signal nul	Dispositif utilisant le signal pleine puissance	Charge courante maximale autorisée
Veille	Actif	Actif (dans 1ms)	Ne pas tenir compte	Inactif	< 1mA
Occupé	Inactif	Inactif	Actif. Une opération de mise à jour XIP ou d'écriture disque explicitement demandée est en cours	Ne pas tenir compte	50 mA
Arrière-plan En attente	Inactif	Inactif	Actif. Aucune opération d'arrière-plan à puissance élevée n'est en cours	Inactif	20 mA
Arrière-plan Occupé	Inactif	Inactif	Actif. Une opération d'arrière-plan à puissance élevée est en cours	Actif	50 mA
Normal En attente	Inactif	Inactif	Inactif. Aucune opération de mise à jour XIP ou d'écriture disque explicitement demandée n'est en cours	Inactif (dans 1 ms)	20 mA
Normal Occupé	Inactif	Inactif	Inactif. Aucune opération de mise à jour XIP ou d'écriture disque explicitement demandée n'est en cours	Inactif (dans 1 ms)	50 mA

TABLEAU 2

Si le Dispositif supporte une section formatée IDE, alors il supportera les commandes Idle (au repos) et Sleep (en attente) standard de la spécification ATA pour contrôler les états de puissance du contrôleur de disque IDE.

Etant donné que le Dispositif est destiné à des applications intégrées et particulièrement à des applications intégrées nomades, la taille revêt un aspect

important. Un modèle de système incorporant le Dispositif doit équilibrer la capacité par rapport à l'espace disponible. Par exemple, plusieurs tailles discrètes seront normalisées dans chacun des deux modes de réalisation (Modulaire et Composant).

Les exigences fonctionnelles du Dispositif sont les suivantes :

En se référant à la figure 52, un diagramme synoptique représentant la structure logique d'une implémentation typique du dispositif, le Dispositif 7300 fournit le support pour deux sections à mémoire : une section XIP (eXecute In Place) 7302 et une section Disque 7304.

La section XIP du Dispositif 7304 supporte un réglage en taille allant de 0 kilo-octet à 256 kilo-octets par incréments de 64 kilo-octets.

Des sections XIP plus importantes (supérieures à 256 kilo-octets) et/ou des granularités de réglage plus petites (inférieures à 64 kilo-octets) peuvent être optionnellement supportées mais ne doivent pas empêcher la compatibilité avec les exigences ci-dessus.

Le Dispositif contient deux contrôleurs logiques 7306a, 7306b et deux zones de mémoire logique 7308a, 7308b. Bien que des implémentations spécifiques du dispositif puissent combiner les fonctions des deux contrôleurs ou des deux zones de mémoire, ces termes sont utilisés ici pour décrire la fonctionnalité requise.

La section XIP 7302 du Dispositif 7300 peut être subdivisée en 2 sous-sections : la sous-section IPL (Initial Program Loader ou chargement du programme initial) et la sous-section BIOS (Basic Input/Output System ou système de base d'entrée/sortie). Pour une utilisation dans un Système spécifique chaque dispositif est configuré pour l'utilisation de la ou des sous-sections requise(s).

La sous-section IPL de la section XIP du Dispositif, si configurée pour une utilisation par le Système, a une taille de 64 kilo-octets et est adressée comme les premiers 64 kilo-octets d'une zone adressable linéaire de la section XIP. Si le modèle d'un Système nécessite que la sous-section IPL soit

interchangée avec la sous-section BIOS, alors le Système doit assurer la logique pour ajuster les lignes d'adresses fournies au dispositif. Aucun remappage logique de la section XIP ne nécessite d'être implémenté à l'intérieur du Dispositif.

Des tailles de sous-section IPL plus grandes ou plus petites que 64 kilo-octets peuvent être optionnellement supportées, mais ne doivent pas empêcher la compatibilité avec les exigences ci-dessus.

La sous-section BIOS de la section XIP du dispositif, si configurée pour une utilisation par le Système est réglable en taille dans une plage allant de 64 kilo-octets à 256 kilo-octets par incréments de 64 kilo-octets. Une taille BIOS de 256 kilo-octets est autorisée par un dispositif avec une section XIP de 256 kilo-octets seulement si la sous-section IPL n'est pas configurée pour l'utilisation. Si le modèle d'un système nécessite un remappage des zones du BIOS, alors le Système doit fournir la logique pour ajuster les lignes d'adresses fournies au Dispositif. Aucun remappage logique de la section XIP ne nécessite d'être implémenté dans le Dispositif.

Des tailles de sous-section BIOS plus grandes et/ou des granularités plus petites peuvent être optionnellement supportées mais ne doivent pas empêcher la compatibilité avec les exigences ci-dessus.

Pour des modes de réalisation Modulaire du Dispositif, le partitionnement du Dispositif en une section XIP et une section Disque est possible via un montage de configuration externe séparé auquel le dispositif est connecté via le connecteur standard décrit ci-dessus.

Pour des modes de réalisation Composant du Dispositif, le partitionnement du Dispositif en une section XIP et une section Disque est possible soit sur circuit soit via un montage de configuration externe (si la carte Système elle-même est équipée du connecteur de Dispositif standard).

La configuration réelle de la section XIP du Dispositif est réalisée via l'interface de configuration standard décrite ci-dessus.

Il est admissible de requérir des tensions d'alimentation de 5 V (pour la

radio) ou 12 V (en plus des tensions d'exploitation standard de 3,3 V ou de 5 V) à des fins de configuration uniquement. Ces tensions d'alimentation ne doivent pas être utilisées excepté lorsque le signal approprié est présent. Ce signal identifie que les tensions d'alimentation de la configuration sont valides et que la configuration du Dispositif est autorisée. A un minimum, les tensions d'alimentation de la configuration et le signal seraient fournis par le montage de configuration externe via le connecteur de Dispositif standard. Les tensions d'alimentation de la configuration et le signal sont décrits ci-dessus.

La configuration du Dispositif une fois exécutée, peut être mémorisée à l'intérieur du Dispositif de manière non volatile. Ceci peut nécessiter l'utilisation d'une zone mémoire de configuration séparée. Bien qu'il soit possible de reconfigurer le Dispositif dans le cas d'une configuration erronée, ceci est considéré comme un événement peu fréquent. Il est par conséquent admissible de limiter le nombre de reconfigurations (pour permettre l'utilisation d'une zone mémoire de configuration de réécriture limitée). En tout état de cause, un minimum de, par exemple, 100 reconfigurations est supporté.

Il est possible de détecter les capacités et la configuration du Dispositif. Les capacités et la configuration de la section XIP sont déterminées via l'interface décrite ci-après.

La section Disque du Dispositif est conforme à l'un des deux formats : IDE (Integrated Drive Electronics ou gestion de périphériques à électronique intégrée) ou FTL (Fast Transient Loader ou charge transitoire rapide). Un mécanisme standard existe pour déterminer lequel des deux formats est supporté par une implémentation du Dispositif. Il est admis d'avoir une implémentation du Dispositif qui supporte les deux formats. Dans un tel cas, une option de configuration supplémentaire doit être fournie pour sélectionner le format qui sera utilisé en tant que Dispositif "primaire" ou "d'amorçage". La sélection et la détection de la configuration de la section disque n'est pas requise pour permettre des accès en lecture à la section XIP imbriqués avec des accès à l'interface E/S du contrôleur XIP. En conséquence, le système

peut ne pas exécuter à partir de la section XIP tout en mettant à jour ou en configurant la section XIP via le contrôleur XIP.

Une section Disque supportant le format IDE assure une émulation complète d'un disque dur IDE et est configurable pour fonctionner dans l'un quelconque des modes suivants : maître IDE primaire, esclave IDE primaire, maître IDE secondaire, esclave IDE secondaire. La sélection du mode est déterminée par les positionnements des signaux appropriés décrits ci-dessus.

La gestion du disque dur logique à l'intérieur de la zone de mémoire disque est effectuée par le contrôleur de Disque à l'intérieur du Dispositif. L'accès au disque dur logique s'effectue via des commandes IDE envoyées au contrôleur de Disque par le pilote IDE à l'intérieur du BIOS.

Une section Disque supportant le format IDE est configurable pour fonctionner dans l'un ou l'autre des modes à 8 ou 16 bits de large. La largeur des données est sélectionnée par le système via le signal approprié. Bien que ce signal puisse être contrôlé dynamiquement par le système, il devrait normalement être attaché haut ou bas en fonction des capacités du Système. Lorsque le signal est présent, le signal correspondant est utilisé par le Dispositif pour indiquer au Système que des accès 16 bits sont requis.

Un diagramme synoptique représentant une implémentation possible du Dispositif avec une section Disque au format IDE est représenté sur la figure 53.

L'implémentation du Dispositif 7310 montrée contient des contrôleurs XIP 7312 et Disque 7314 séparés et des zones de mémoire XIP 7316 et Disque 7318 séparés. Le contrôleur XIP 7312 gère la configuration et la mise à jour de la zone de mémoire XIP et le contrôleur de Disque gère l'émulation de l'unité IDE en utilisant la zone de mémoire Disque.

Une section Disque supportant le format FTL est représentée sur la figure 54 dans un diagramme synoptique et fournit un mécanisme standard pour accéder à des blocs pour le stockage à l'intérieur de la zone de mémoire XIP. Ce mécanisme standard peut être le même indépendamment de la

technologie utilisée pour implémenter la zone de mémoire disque à l'intérieur du Dispositif et est décrit ci-après.

L'implémentation du Dispositif représenté contient un contrôleur unique 7320 servant à la fois de contrôleurs XIP et Disque (FTL) et un zone de mémoire unique 7322 servant à la fois de zones de mémoire XIP et Disque. Aucun support IDE n'est prévu, et les fonctions contrôleur XIP et Disque partagent une logique commune.

Le BIOS de chaque système qui utilise le Dispositif doit inclure à la fois des pilotes IDE et FTL pour s'assurer que toutes les implémentations du Dispositif peuvent être utilisées sur tous les systèmes.

La section XIP du Dispositif émule une mémoire morte linéaire adressable par mots de 8 bits (par exemple équivalents à une EPROM de taille similaire). Des bits d'adresses suffisants pour adresser jusqu'à 256 kilo-octets sont fournis par le Système au Dispositif et sont décodés si nécessaire à l'intérieur du Dispositif. Le signal approprié est fourni par le Système au Dispositif pour identifier que la zone XIP est en train d'être adressée. Le décodage d'adresses requis pour produire le signal à partir d'une plage plus large de bits d'adresses est sous la responsabilité du Système.

Une émulation EPROM 16 bits peut être optionnellement supportée, mais ne doit pas empêcher la compatibilité avec les exigences ci-dessus. S'il est supporté, le mode d'émulation EPROM 16 bits sera validé par le Système via le signal approprié. Bien que le signal puisse être contrôlé dynamiquement par le Système, il devrait être normalement attaché haut ou bas en fonction des capacités du système. Lorsque le signal est présent et que le Dispositif supporte le mode 16 bits, alors le signal correspondant est utilisé pour indiquer au Système que des accès 16 bits sont requis.

Le contenu de la section XIP du Dispositif, s'il est configuré pour une utilisation par le Système, peut être mis à jour, sur circuit, via une interface de programmation normalisée. Le Dispositif supporte l'interface de programmation de la section XIP standard décrit ci-après, indépendamment des

technologiques spécifiques utilisées dans l'implémentation de la zone de mémoire XIP du Dispositif.

La sous-section IPL de la section XIP du Dispositif, si elle est configurée pour être utilisée par le Système est indépendamment protégeable de la mise à jour via un signal qui "protège" ou "déprotège" la sous-section IPL.

La section Disque pourra être mise à jour, sur circuit, via le pilote de disque DOS standard et les pilotes BIOS IDE ou FTL standard, indépendamment des technologies spécifiques utilisées dans l'implémentation de la zone de mémoire du Disque du Dispositif.

La capacité mémoire nominale du Dispositif est définie pour être de la taille de la section Disque supportée par le Dispositif lorsqu'une section XIP de 256 kilo-octets a été configurée. Ceci devrait fournir une mesure du pire des cas pour toutes les implémentations.

Bien qu'il soit admis pour une implémentation d'étendre la taille de la zone XIP au-delà des exigences de la présente description, cet espace supplémentaire ne sera pas considéré comme devant augmenter la capacité mémoire nominale du Dispositif à moins d'être incorporé dans la section Disque lorsque la section XIP est configurée à une taille de 256 kilo-octets.

La section XIP du Dispositif assure une performance suffisante pour permettre une exécution directe du code à partir de la mémoire linéaire émulée. Etant donné que le dispositif est interfacé par le bus ISA, la vitesse maximale d'accès peut être limitée lorsqu'appropriée par la vitesse du bus ISA à 8 MHz. L'utlisation des états d'attente prolongée du bus ISA (par l'utilisation du signal approprié) est autorisée dans l'éventualité d'un accès retardé à des données XIP, mais le nombre maximal d'états d'attente ne sera pas supérieur à 10 et le nombre moyen d'états d'attente ne sera pas supérieur à 2.

Bien que le système puisse supporter optionnellement la possibilité de "dupliquer" le BIOS ou autre code système à partir de la zone XIP vers la RAM (mémoire vive) du système pour une performance améliorée, ceci ne doit pas être nécessaire pour satisfaire les exigences de performance évoquées ci-