(51) **International Patent Classification**[7]: **G08B 21/02**, H04M 11/04

(21) **International Application Number:**
PCT/SE2004/001884

(22) **International Filing Date:**
15 December 2004 (15.12.2004)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
0303355-2   15 December 2003 (15.12.2003)   SE

(71) **Applicant** *(for all designated States except US)*: **FINDU SYSTEMS AB** [SE/SE]; Stena Center 1A, S-412 92 Göteborg (SE).

(72) **Inventor; and**
(75) **Inventor/Applicant** *(for US only)*: **JOHANSSON, Thomas** [SE/SE]; Kaprifolgatan 37, S-426 69 Västra Frölunda (SE).

(74) **Agent: VALEA AB**; Lindholmspiren 5, S-417 56 Göteborg (SE).

(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

[Continued on next page]

(54) **Title:** PERSONAL ALARM SYSTEM
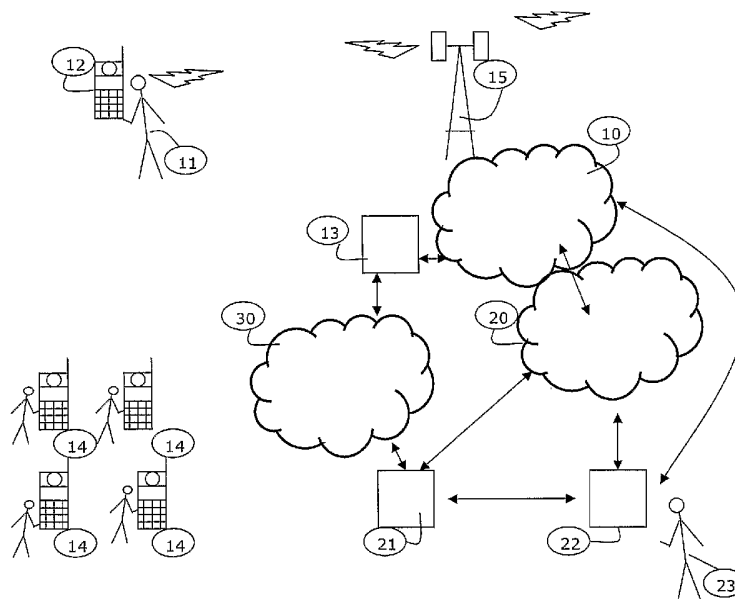
(57) **Abstract:** A method and a system for safeguarding the personal security of a particular person, by the use of a cellular phone and a server system (21) with software, capable of CLI detection and with data links to cellular mobile operators (13) to determine the position of the particular cellular phone calling. The server holds additional pre-stored personal data and information, which is added when alarm is automatically forwarded to an alarm central (22), utilising standardized alarm protocols. The response and action from the alarm central is configurable on an individual basis. In addition to or instead of the above alarm central transmission, the alarm message can be sent to a predetermined list of recipients by any type of mobile messaging.

Personal alarm system

Field of the invention

5   The present invention relates generally to an alarm system for personal security. In
particular, the present invention is a system and method for expediting adopted
actions by the connected alarm central and/or if needed also notifying several other
persons whenever the personal security of the person is compromised and
assistance is required.

10

Background of the invention

Emergency situations may arise anywhere. The emergency may be compounded by
inclement weather, a disabling injury, etc. It is of a major interest to be able to

15   quickly alarm about the situation in order to quickly be found and get assistance.

Generally, a person must dial an emergency number, and attempt to provide
landmark or navigational data for the benefit of the authorities. These tasks are
difficult when performed under the stress of an emergency situation, and they can

20   be impossible when a person is disabled or has an injury.
Unfortunately, a cellular telephone only provides the communication link. It will not
of itself perform the task of communicating. This task is left to the person.
Consequently, the person must perform the following tasks:
1. remember the telephone number of the proper authorities; and

25   2. dial the number; and
3. convey landmark or navigational data to direct the respondents to the site; and
4. Communicate the type of situation and what type of assistance that is needed to
the answering operator of the general emergency number.
In an emergency situation it is not always, due to time stress, possible to quickly

30   give all information needed in order to get the proper and accurate assistance.
The time it takes to complete the above described tasks jeopardizes the health and
security of the person. This is especially true when the person has no idea of his or
her location and cannot provide the requisite navigational data and/or emergency
situation information to the authorities. More often, the instructions and information

35   provided are inaccurate, misleading, or misunderstood.

On the market surveillance companies provide alarm centrals on a commercial basis.

To be able to contact these specialised alarm centrals there is a need for a pre-registration and also the use of some kind of special apparatus equipped with the special protocols needed for communication with these alarm centrals. Typical equipment connected to these alarm centres are burglary alarms and elevator alarms using dial up connection.

A few devices with GPS satellite positioning capability and communication capability via cellular networks are also available on the market. These devices are specially designed as portable alarm devices. They are easily triggered by pressing a few buttons and are then predefined to initiate a call to an alarm central using standardized alarm communication protocols. When triggered, these devices send the alarm position and the special alarm identification code of the device, to the alarm centrals.

One drawback with these GPS based devices is the need for line of sight to at least two satellites preferably three for making a positioning. This reduces the use of these devices to outdoor use and then with specific problems in areas with high buildings. Through a method of continuous positioning and timestamp to each position, the last known position is transmitted when trigging the alarm. In areas like subways, garages or large indoor shopping areas this technique has obvious drawbacks. Also the unit should be worn outside of clothing to make best possible chance for an accurate positioning.

This means that an alarm trig with the most current position will be delayed, due to the fact that the person has to hold the device up into the air and wait for a proper positioning before being able to trig the alarm.

Making a phone call and store a phone number is a basic function of a cellular phone. All alarm call devices intended for wireless alarm functions depend upon additional functions to be able to send an alarm. These special alarm call devices need to have data saved and formatted in advance in order to be able to communicate automatically with the alarm central.

Also they depend upon GPS or similar satellite positioning data with earlier described drawbacks. The end users also find the cost for these specially designed or incorporated devices to be too high.

Summary of the invention

Current invention eliminates these drawbacks and can be used by all cellular
phones as a special service after registration.

5   Personal security demands an automated, yet economical system for summoning
an emergency response in accordance with the specific personal needs of the
individual. This invention takes use of the available services of positioning within
cellular network operators. This positioning service has the feature of being
available at all locations where there is coverage of the cellular network. This
10   means that the service normally is available even indoors where many crimes are
conducted. The accuracy of the positioning will vary depending on specific areas but
the most accurate positioning will be possible in dense areas where most of the
alarm calls can be expected.

15   In a first aspect of the invention, a method for safeguarding the personal security of
a particular person is provided comprising the steps of:
-    monitoring a range of incoming phone lines with different incoming phone
     numbers and detecting incoming Calling Line Identification (CLI) and the
     dialled number of the incoming trig-call;
20   -   comparing CLI to personal information pre registered and stored in a server,
     and determine action depending on stored information; several different sets
     of actions may be taken, depending of what number that was dialled and the
     pre-stored information;
-    establishing a data link to the mobile operator matched to the incoming CLI
25   to get a location and position within the network through a positioning
     service of subscription;
-    formatting and preparing different digital messages aimed for mobile
     networks message data transmission or other digital message format, for
     example, but not limited to SMS, EMS, MMS, or E-mail including the
30   retrieved information of the position and the personal data;
-    sending a digital message of confirmation receipt to the triggering cellular
     phone;
-    choosing to send or not send a digital message to list of known recipients
     according to personal stored information and dialled number;
35   -   choosing to send or not send a specially formatted alarm message to an
     alarm central for further actions according to personal stored information

4

and dialled number; different suitable and available alarm protocols may be set according to predefinition.

5   The method may further comprise the step of: sending identification code according to standard alarm transfer protocol and transferring the incoming voice mode call (trig call) from the alarm trig server to the said alarm central to enable a two-way voice communication between the operator of the said alarm centre and the person in need for help.

10

The method may yet further comprise the step of: the alarm trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.

15   The method may still yet further comprise the step of: pre storing an emergency number in a short list in said cellular phone.

The method may further comprise the steps of:

- registering personal information in a system database at subscription of the
20   alarm service;
- storing personal information relating to a particular person in an alarm trig server system, said personal information including a personal identification as well as other information characteristic of said particular person. The information may be shared, linked or transferred to the alarm central
25   software through data interface;

In a second aspect of the invention, an apparatus for receiving incoming alarm trigs is provided, comprising:
an alarm trig system and software for detecting incoming calls and communicate
30   with appropriate alarm central and mobile network operators; the server software holds a database of customer data with remote access to modify and create individual entries; the server software has a remote access so that the alarm central operator can access the individual data in a case of triggered alarm; the server software has the capacity of matching individual customer data to different
35   and updateable modules for protocols for interfacing various positioning servers; the server software has the capacity of matching individual customer data to

5

different and updateable modules for protocols for interfacing various alarm
centrals.

The invention may further be implemented in an alarm system comprising at least:
5   –   a communication device;
     –   a communication infrastructure;
     –   an alarm trig server comprising: an alarm trig system and software for
         detecting incoming calls and communicate with appropriate alarm central
         and mobile network operators; the server software holds a database of
10   customer data with remote access to modify and create individual entries;
         the server software has a remote access so that the alarm central operator
         can access the individual data in a case of triggered alarm; the server
         software has the capacity of matching individual customer data to different
         and updateable modules for protocols for interfacing various positioning
15   servers; the server software has the capacity of matching individual
         customer data to different and updateable modules for protocols for
         interfacing various alarm centrals.

20   *Brief description of the drawings*

The above-described and other objects, features, and advantages will become more
apparent from the following detailed description of the preferred embodiments and
certain modifications there of when taken together with the accompanying drawing
25   in which:

FIG. 1 shows an overview of a personal security system in accordance with the
preferred embodiment of the present invention.

30   *Detailed description of the preferred embodiment*

Referring now to FIG. 1,
A personal security system and method according to the present invention includes
a Cellular phone (12), which is transported along with a person (11). The cellular
35   telephone (12) may be any conventional cellular telephone, connected to a public
land mobile network PLMN (10), and pre-registered in the database of the alarm
service server (21). The PLMN communicates with cellular phone through a network

6

of several base stations (15). The PLMN network is connected to the Public
Switched Telephony Network PSTN (20). Hence, the present invention should not
be construed as limited to a cellular telephone, any network with positioning service
and interconnection to PSTN (10) is possible to use.

5

The personal data and phone number of the cellular phone and person is being
registered when signing a subscription of the alarm service.

The personal security method also uses an alarm central (22), which is manned by
10   an alarm central operator (23). This type of alarm central with automated
registration and verification of incoming alarm calls is commonly available among
surveillance companies.

The personal security system also includes an alarm trig server (21) that is a major
15   part of the current invention.
In the preferred embodiment of the alarm trig server (21) the following features
and functions are performed:
One or multiple interface and communication links for one or several public land
mobile network PLMN (10), example but not limited to GSM, CDMA or any mobile
20   operators providing location services. The communication to such service is often
performed using TCP/IP over internet (30) but any conventional data link can be
used.

Recognition of incoming calls from PLMN (10) through PSTN (20) by using CLI
25   presentation.

Match CLI with the customer database.

Answer the alarm call by a voice message or use tone signaling to trigger incoming
30   mobile phones to continue a dialing sequence in case of a "Secret CLI" or otherwise
non presented CLI has been prompted by PSTN Network. Confirm and propose to
hang up or alternatively dial the alarm central on a parallel line, send Identification
code according to customer database in an alarm protocol format, example but not
limited to P100, then transfer the original incoming call to the alarm central (22).

35

Format and send network specific digital messages to list of predefined recipients
(14) according to individual match in customer database.

Format and send network specific digital message based alarm trig to Alarm central (22) including object code and position according to individual match in customer database.

External data interface for customer database create, update and read.

The alarm trig server (21) is controlled by database software to control and manage the above functions. The database will hold personal information to help and guide the alarm central operator (23) in an alarm situation. The information may consist of (as an example of but is not limited to) weight, length, hair color, eye color, frequently used addresses , eventual medicine prescription, known medical problems, a list of cellular phone numbers to friends (14) capable of receiving alarm notification, current PLMN operator, action list to perform upon alarm. This software may perform alone or in conjunction with existing alarm handling software at alarm central (22) where data can be separated or shared in any combination according to set up.

The software to enable external data interface to the alarm central operator (23) in order to access above information and features of repositioning, confirming and resetting alarm status during an alarm call situation.

In general operation, the client (11) carry the cellular phone (12) and, due to a variety of personal security conditions, manually triggers the dialling sequence (e.g. by choosing a pre stored emergency number from a short list in the cellular phone) to initiate a normal phone call to the Alarm trig server (21). The Alarm trig server will determine the CLI of the incoming call, compare this with the database of registered clients and establish a data link to corresponding mobile operator (13) with a predefined communication protocol. The service of positioning (13) is maintained on a subscription basis by the mobile operator. Individual subscription of this service is set up at first registration of each client in the alarm service. Positions can be obtained in two various formats, either the Latitude/Longitude format or a predefined description of the area corresponding to the current position. Both formats are asked for during the data link communication with the mobile cellular operator (13). Once the position is obtained several individually formatted digital messages will be initiated, one is formatted according to protocol used for transmitting alarm messages to the central alarm station (22) and one is

8

formatted for transmission to the individual list predefined known recipients (14).
One is used to a reply back to initiating cellular phone (12) to confirm the trig.
Above messages are set out as example and any number of messages may be
used.

5

Once the alarm call is transferred, to the alarm centre (22) the information is
conveniently displayed to the alarm central operator (23) through the use of
common alarm protocols. In parallel the pre-stored personal data file is made
accessible to the operator by the information stored in the alarm database of the
10   alarm central.

It is the use of CLI or dialling sequence, combined with network positioning, and
pre-stored personal information , that enables common cellular phones to
communicate with the alarm central (22). The assistance from the alarm central
15   operator (23) will be available even without the need of any additional manual
information or action from the person in need (11) and actions can be launched
according to predefinition and location provided. Should two-way speech
communication additionally be possible the assistance may be adopted and focused
accordingly. This allows the operator (23) to dispatch the proper responding
20   agents. The response will be more efficient, more accurate and based on stored
information, The alarm central operator (23) may also immediately contact the
proper authorities depending on situation.
The operator (23) can also provide supplementary information such as special
health conditions of the person in need (for instance, diabetes, heart problems,
25   etc.) and continuously monitor the position of the person through provided data
links.

A method for safeguarding the personal security of a particular person according to
the present invention, comprising the steps of:
30   –   registering personal information in a system database at subscription of the
                alarm service;
           –   storing personal information relating to a particular person in an alarm trig
                server system, said personal information including a personal identification
                as well as other information characteristic of said particular person. The
35   information may be shared, linked or transferred to the alarm central
                software through data interface;

- monitoring a range of incoming phone lines with different incoming phone numbers and detecting incoming Calling Line Identification (CLI) and the dialled number of the incoming trig-call;

- comparing CLI to personal information and determine action depending on stored information. Several different sets of actions may be taken, depending of what number that was dialled and the pre-stored information;

- establishing a data link to the mobile operator matched to the incoming CLI to get a location and position within the network through the positioning service of subscription;

- formatting and preparing different digital messages aimed for mobile networks message data transmission or other digital message format, example but not limited to SMS, EMS MMS or E-mail including the retrieved information of the position and the personal data;

- Sending a digital message of confirmation receipt to the triggering cellular phone;

- sending or not sending digital message to list of known recipients according to personal stored information and dialled number;

- sending or not sending a specially formatted alarm message to an alarm central (22) for further actions according to personal stored information and dialled number. Different suitable and available alarm protocols may be set according to predefinition.

The method further comprises the step of, sending identification code according to standard alarm transfer protocol and transferring the incoming voice mode call (trig call) from the alarm trig server (21) to the said alarm central (22) to enable a two-way voice communication between the operator of the said alarm centre (23) and the person in need for help (11).

The method further comprises the step of the alarm trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.

A server for receiving incoming alarm trigs according to the present invention, comprising:

an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software also holds a database of customer data with remote access to modify and create

individual entries; the server software has a remote access so that the alarm
central operator can access the individual data in a case of triggered alarm; the
server software has the capacity of matching individual customer data to different
and updateable modules for protocols for interfacing various positioning servers;
5   the server software has the capacity of matching individual customer data to
different and updateable modules for protocols for interfacing various alarm
centrals.

The invention may be implemented in software code in its entirety in a server or in
10   parts divided into one or several devices.

The invention may be implemented in an alarm system, comprising at least:
      –   a communication device (12);
      –   a communication infrastructure (15);
15   –   an alarm trig server (21) according to claim 6.

It should be noted that the word "comprising" does not exclude the presence of
other elements or steps than those listed and the words "a" or "an" preceding an
element do not exclude the presence of a plurality of such elements. It should
20   further be noted that any reference signs do not limit the scope of the claims, that
the invention may be implemented by means of both hardware and software, and
that several "means" may be represented by the same item of hardware.

Having now fully set forth the preferred embodiments and certain modifications of
25   the concept underlying the present invention, various other embodiments as well as
certain variations and modifications of the embodiments herein described will
obviously occur to those skilled in the art upon becoming familiar with said
underlying concept. It is to be understood, therefore, that within the scope of the
appended claims, the invention may be practiced other than as specifically set forth
30   in the disclosure.

Claims

1. A method for safeguarding the personal security of a person, comprising the steps of:

5   – monitoring a range of incoming phone lines with different incoming phone numbers and detecting incoming Calling Line Identification (CLI) and the dialled number of the incoming trig-call;

– comparing CLI to personal information pre registered and stored in a database, and determining action depending on stored information; several

10   different sets of actions may be taken, depending of what number that was dialled and the pre-stored information;

– establishing a data link to the mobile operator matched to the incoming CLI to get a location and position within the network through a positioning service of subscription;

15   – formatting and preparing different digital messages aimed for mobile networks message data transmission or other digital message format, for example, but not limited to SMS, EMS, MMS, or E-mail including the retrieved information of the position and the personal data;

– sending a digital message of confirmation receipt to the triggering cellular

20   phone;

– choosing to send or not send a digital message to list of known recipients according to personal stored information and dialled number;

– choosing to send or not send a specially formatted alarm message to an alarm central (22) for further actions according to personal stored

25   information and dialled number; different suitable and available alarm protocols may be set according to predefinition.

2. The method according to claim 1, further comprising the step of, sending an identification code according to a standard alarm transfer protocol and transferring

30   said incoming voice mode call (trig call) from an alarm trig server (21) to said alarm central (22) to enable a two-way voice communication between an operator of said alarm central (23) and the person in need of help (11).

3. The method according to claim 1 or 2, further comprising the step of an alarm

35   trig server sending answering tones to trigger calling mobile phone to continue predefined dialling sequence with identification code if CLI should not be presented.

4. The method according to claim 1, further comprising the step of pre storing an emergency number in a short list in said cellular phone.

5. The method according to claim 1, further comprising the steps of:
   - registering personal information in a system database at subscription of the alarm service;
   - storing personal information relating to a particular person in an alarm trig server system, said personal information including a personal identification as well as other information characteristic of said particular person. The information may be shared, linked or transferred to the alarm central software through data interface;

6. A server (21) for receiving incoming alarm trigs comprising:
an alarm trig system and software for detecting incoming calls and communicate with appropriate alarm central and mobile network operators; the server software holds a database of customer data with remote access to modify and create individual entries; the server software has a remote access so that the alarm central operator can access the individual data in a case of triggered alarm; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various positioning servers; the server software has the capacity of matching individual customer data to different and updateable modules for protocols for interfacing various alarm centrals.

7. An alarm system comprising at least:
   - a communication device (12);
   - a communication infrastructure (15);
   - an alarm trig server (21) according to claim 6.

1/1
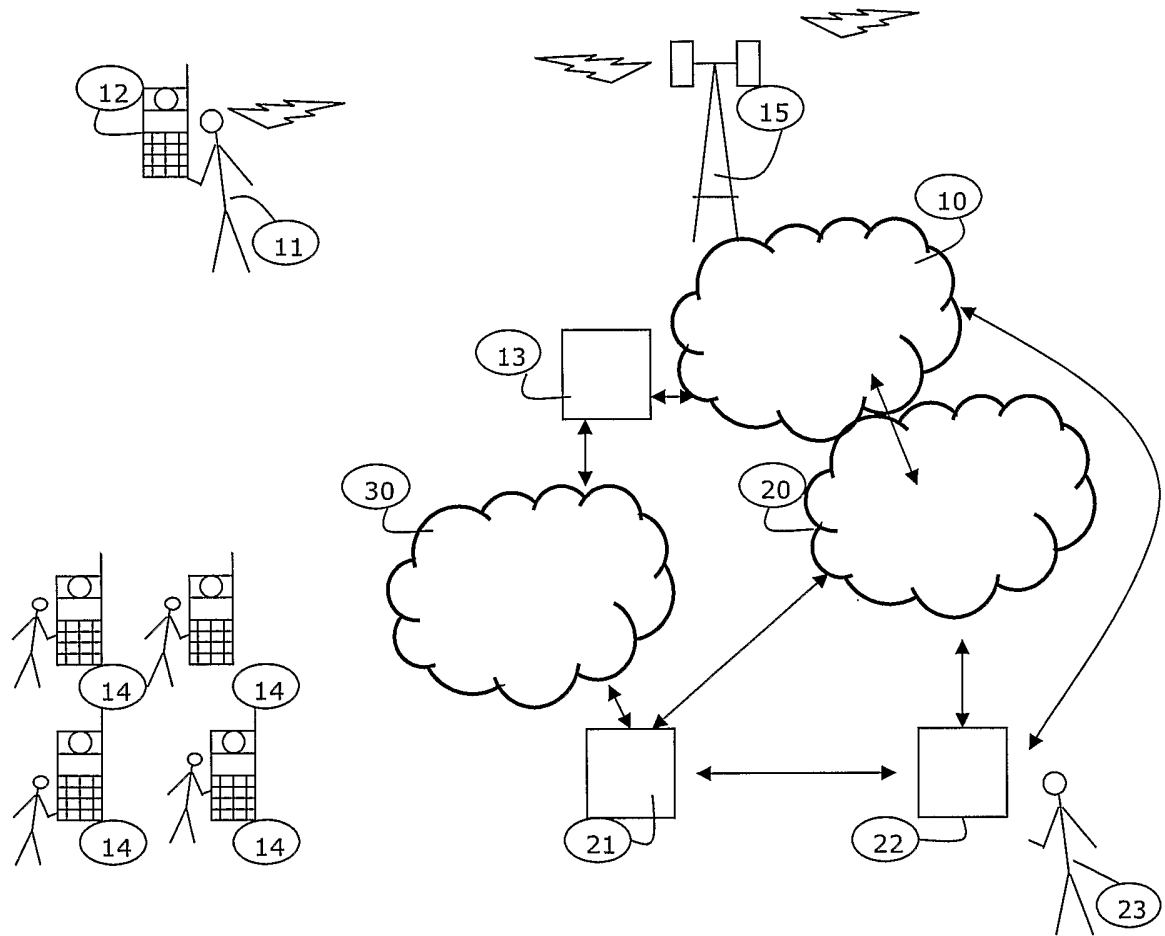
Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/001884

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G08B 21/02, H04M 11/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G08B, H04M

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL,WPI,PAJ,INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20020027975 A1 (L.T.OXLEY), 7 March 2002 (07.03.2002), page 2,part 0041-page 4, part 0045, page 4,part 0049,fig 1,4 --	1-7
X	US 5805670 A (R.M.PONS ET AL), 8 Sept 1998 (08.09.1998), column 3, line 57 - line 60; column 4, line 36 - column 6, line 18; column 7, line 62 - column 9, line 11, claim 8 --	1-7
X	CA 2283087 A1 (CLEARNET PCS INC.), 9 March 2001 (09.03.2001), page 10, line 28 - page 19, line 19 --	1-7

X	Further documents are listed in the continuation of Box C.		X	See patent family annex.

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
9 March 2005	1 4 -03- 2005

Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Gordana Nikovic / itw Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2004/001884

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5388147 A (G.J.GRIMES), 7 February 1995 (07.02.1995), abstract --	1-7
A	US 5334974 A (J.R.SIMMS ET AL), 2 August 1994 (02.08.1994), abstract -- --------	1-7

US	20020027975	A1	07/03/2002	US	20030091159	A	15/05/2003
				US	6671350	B	30/12/2003
US	5805670	A	08/09/1998	AU	1465597	A	10/10/1997
				WO	9735440	A	25/09/1997
CA	2283087	A1	09/03/2001	NONE			
US	5388147	A	07/02/1995	NONE			
US	5334974	A	02/08/1994	CA	2129425	A	07/08/1993
				EP	0626088	A	30/11/1994
				US	5808564	A	15/09/1998
				WO	9316452	A	19/08/1993