(54) Title: METHOD AND ARRANGEMENT FOR PROCESSING AND REDISTRIBUTING POSITION AND STATUS DATA



201    202    203    204    205
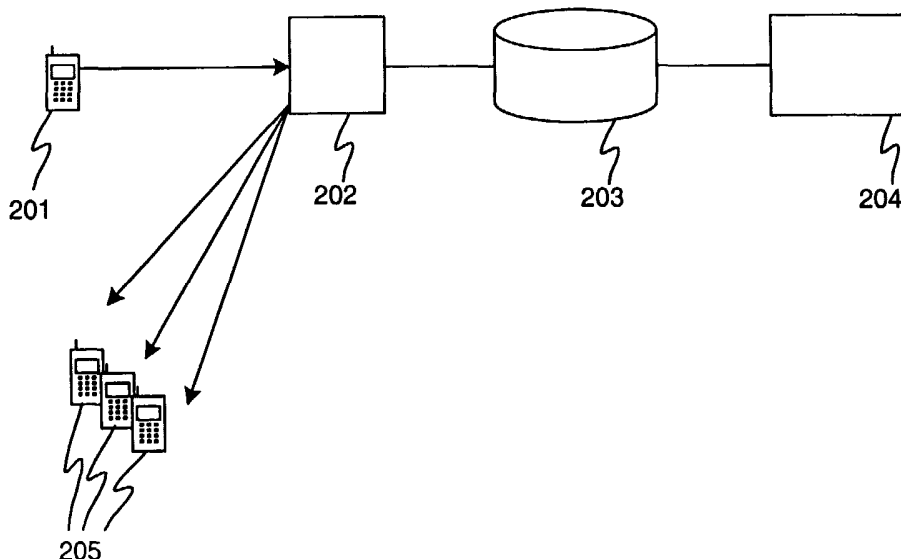
(57) Abstract: The invention relates to utilizing the position and status data transmitted by portable terminals in various usage environments. In particular, the invention relates to the recording, analyzing and distribution of position and status data. The method according to the invention for processing and redistributing position and status data comprises steps where a message containing position and status data is received in a reception channel and recorded, at least partly in a data storage. For the position and status data stored in the data storage, there is defined, on the basis of the position and/or status data, at least one receiver to whom said information is transmitted through a redistribution channel.

Method and arrangement for processing and redistributing position and status data

The invention relates to utilizing the position and status data transmitted by mobile
stations in various usage environments. In particular, the invention relates to the
5   recording, analyzing and distributing of position and status data.

Position can be defined for instance by means of the global positioning system GPS.
The GPS system includes 24 satellites placed on six different orbits, four satellites
on each orbit. Updated data is transmitted to each satellite via three earth antennas.
The GPS user has a receiver that typically tells the user the location, speed and exact
10  time. Said known technique is widely used as an aid in positioning for example in a
difficult ground or on water.

The mobile phone manufacturer Benefon has introduced navigation telephones
where a GSM (Global System for Mobile Communication) telephone is provided
with a built-in GPS equipment. The Benefon navigation telephone has a 12-channel
15  GPS receiver that continuously tracks and uses up to 12 satellites. The device
indicates coordinates, the time and the mode of the satellites. At the priority date of
the present application, more information of these navigation phones is found at the
address http://www.benefon.com.

Figure 1 on schematical illustration of a prior art mobile phone with an integrated
20  positioning arrangement 110. The mobile phone comprises an antenna 108 and a
duplexer 109, i.e. a transceiver duplexer for transmitting and receiving data and
position information. The sound signal transmitter branch includes a microphone
101, an amplifier 102, an A/D converter 103 and a transmission unit 104.
Respectively, the receiver branch includes a receiver unit 112, a D/A converter 113,
25  and amplifier 114 and a loudspeaker 115. In addition, the mobile station includes a
memory unit 107 for recording data, a keypad 111 for feeding data, a control unit
105 for processing data and a built-in positioning arrangement 110 for obtaining
current position data. All data that is fed in and received in the mobile station, also
the data produced by the positioning arrangement 110, is processed in the control
30  unit 105.

In the Benefon navigation telephones, there is installed a map reading program using
a MMPS protocol (Mobile Maps Service Protocol) which at the priority date of the
present application is introduced at the address http://www.benefon.com and which
makes it possible to download maps from the network. The navigation telephone is

capable of downloading land, sea or town maps from a mobile map service known as such. One example of a mobile map service producer is at the priority date of the present invention found at the address http://www.genimap.com/.

In the Benefon navigation telephone, position, tracking and route data can be sent as text messages between service centers and such mobile stations that use the MPTP (Mobile Phone Telematics Protocol), which at the priority date of the present application is introduced at the address http://www.benefon.com. The navigation telephone instructs the user also when it is located outside the coverage area of the GSM network. MPTP enables position and route inquiries, the transmission and reception of position data, emergency calls and the positioning of another receiver. The position data itself may contain position coordinates, the current, average or maximum speed, the heading, the tracking points and routes, the track log and trip or distance measurements.

Nowadays position data is treated in the same way as text messages. Position data is transmitted from one mobile station to another, and the user of the receiving station can process the transmitted data. In case the position data should be transmitted to several different mobile stations, it is possible to form a group of receivers to whom the message is sent. The drawback of a group message is that the sender pays according to the number of sent messages, i.e. according to the size of the group, although all members of the group are typically not interested in every transmitted message.

Because the memory and performance capacity of mobile stations is very limited, the received position data is not generally recorded. When the data is removed from the mobile station, it is completely destroyed and cannot be used or browsed after removal.

The object of the invention is to utilize and process messages containing position data in a versatile fashion. Another object of the invention is a selective resending of processed data in various different channels.

These objects are achieved by recording, processing and resending the data, particularly position data, contained in the message through a reception and redistribution channel according to the invention.

The invention is characterized by what is set forth in the characterizing parts of the independent claims. Preferred embodiments of the invention are introduced in the dependent claims.

Advantageously the messages according to the invention contain position data and status data. Here the term 'status data' means data that indicates the status or observation, or some other similar data of the user, device, system, event, function or product. The status data of a message can be for instance text in the ASCII format,

5 or image, sound or other data according to the MMS (Multimedia Messaging Service) configuration, or a combination of these.

As for position data, it defines the position of the transmitting device. In addition to mere coordinates, the position data in a message can contain for instance the direction and speed of the mobile station. The position data can also be in the form

10 of a vector-shaped image, in which case the depth dimension is obtained as additional information. The position data can also be presented in text form, in the XML (extensible markup language) format or in a format supported by the MPTP (Mobile Phone Telematics Protocol), the SLoP (a Simple Text Format for the Spatial Location Protocol), the MLP (Mobile Location Protocol) or the MPP (Mobile

15 Positioning Protocol). The protocols mentioned above are developed for querying and transmitting location information of mobile stations or other terminals in a wireless network. Typically protocols are based on existing and well-known Internet technologies, such as HTTP (the Hypertext Transfer Protocol) and XML. However, position data is not bound to any given protocol or technique, but according to the

20 invention, any known method for presenting or transmitting position data can be employed.

A message according to the invention defines for instance an event and the location of the event. By using the arrangement according to the invention, there are achieved particular advantages when the station transmitting the data is mobile, in which case

25 its exact location at a given moment is not known, or when there are several possible receivers for a message, and a suitable receiver or receivers should be chosen for example according to position and/or status data.

The mobile station transmits a message containing position and status data, and the message is received in a reception channel according to the invention. Message data

30 is recorded in a suitable data storage. By means of the management application according to the invention, there are produced processing rules, and on the basis of said rules, each received message is processed and analyzed. Also the redistribution of position and status data is carried out on the basis of the processing rules through the redistribution channel according to the invention. On the basis of the processing

35 rules, it is possible to reach even several receivers or to choose the most suitable among the receivers.

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The invention is not dependent on any single positioning technique. In addition to the GPS positioning that was introduced above, in the description of the prior art, there can be used for instance the AGPS (Assisted GPS) technique or some other known positioning technique, such as positioning carried out by means of the mobile
5    network. The mobile network can define the location of the mobile station, or the mobile station and the network together can define the position of the mobile station.

The arrangement according to the invention is suited to many different targets of usage, and from the point of view of the invention, the technical usage environment does not have any essential significance. Likewise, the employed data transmission
10   technology is not bound to any specific format or protocol. The MPTP mentioned in the description of the prior art is one of suitable protocols when using the GSM network as the data transfer medium. The invention is not restricted to the use of any one transfer medium only, but the employed network can be for example a local area network, the Internet or any network where messages containing position and status
15   data can be transmitted.

The arrangement according to the invention can be applied for instance by energy production plants, logistics service enterprises, health care enterprises, public institutions and teleoperators, as well as all such fields of technology where the location of a device, person, function or product varies, or is difficult to define or
20   detect.

The invention is described in more detail below with reference the accompanied drawings, where

figure 1    is a schematical illustration of a prior art mobile station provided with a positioning arrangement,

25   figure 2    illustrates an arrangement according to a preferred embodiment of the invention,

figure 3    illustrates an arrangement for processing and redistributing position and status data according to a preferred embodiment of the invention,

figure 4    illustrates an arrangement for processing and redistributing position and
30              status data according to another preferred embodiment of the invention, and

figure 5    illustrates an arrangement for processing and redistributing position and status data according to a third preferred embodiment of the invention.

Figure 2 illustrates the passage of the position and status data in an arrangement according to a preferred embodiment of the invention. The terminal 201 transmitting the position and status data is generally a mobile terminal, but it can also be a stationary device. The terminal transmitting the position and status data can be for instance a portable phone, a portable computer, a PDA (personal digital assistant) or a similar device that is capable of sending a notice of its position. If the employed terminal is permanently fixed in a given location, positioning becomes unnecessary. In that case the employed terminal can simply be a transmitter. In order to utilize the arrangement according to the invention, it suffices that the terminal is capable of sending its position data, for instance coordinates, and its status data to a reception channel according to the invention. A terminal that employs the arrangement according to the invention is preferably of a type that can define its own position and transmit the defined position data to the reception channel together with the status data.

The terminal device transmits a message containing the position and status data to a reception and redistribution channel 202 according to the invention. Said channel contains programming logics for processing and redistributing the position and status data. In figure 2, the reception and redistribution channel 202 is illustrated as one single unit 202, but it can naturally be composed of several separate elements. In practice, said elements are program components. The reception and redistribution channel 202 performs the message processing and recording in a suitable data storage 203.

The data storage 203 may contain several separate data storage locations and methods. For example, a database can serve as a data storage. The data storage 203 contains information of for instance messages, redistribution rules, users, user terminals and usage environments. In addition, the data storage contains some application specific data. Messages containing position and status data are recorded completely or partly depending on what elements of the data should later be necessary or desirable to use. In the data storage 203, there can also be stored other data connected to the message in question, such as discussions, notices, receivers and acknowledgements. The whole history of the message containing the position and status data can be stored in the memory of the data storage.

A management application 204 is used for controlling the data, such as processing rules and user information, contained in the data storage 203. The management application 204 is a view into the data storage 203, which contains information that can be managed and reported on. Also the processing rules are defined with the aid

of the management application 204. According to the processing rules, the data stored in the data storage 203 can be analyzed, processed and redistributed to various receivers. The processing rules can be defined to be executed for instance on the basis of position and/or status data. A processing rule can define for instance that an observation in a given format that is received from a given device is further transmitted in another format to a given group of devices according to a given transmission technique.

The message processing proper is advantageously realized in the reception and redistribution channel 202 according to the invention, which channel uses the processing rules stored in the data storage 203, said rules being defined by the management application 204. The reception channel uses the data contained in the data storage for example in order to identify the transmitter and message format of a received message. The reception channel converts the received message into a format where it can advantageously be processed. The message or elements thereof that were thus modified are stored in the data storage 203. The reception and redistribution channel 202 can for example compare the information logically or mathematically with an earlier information; it can calculate positions and/or iterate the nearest receiver on the basis thereof; it can add, remove or modify data; choose the receiver on the basis of the desired parameters; modify the message to be transmitted into a format defined for the receiver in question; and transmit the message to new receivers. These steps are typically carried out on the basis of the preceding step, starting from the identification of the received message, which can simply be a command to do something, and from the processing rule chains connected to said identifiers. As the final receivers defined on the basis of the processing rules, there can be several terminal devices 205, as is illustrated in figure 2, or it can be for example an application arrangement that manages certain resources and is capable of operating on the basis of the received information.

A preferred embodiment of the invention is illustrated in figure 3. Here the terminal 301 sending position and status data is permanently installed in a given location. Thus the position data remains unchanged, and it suffices that the terminal is capable of transmitting its position data, for example its position coordinates, in connection with the status message. In the example illustrated in figure 3, for example a terminal 301 is now placed for instance in a gas pipe provided with sensors for detecting a possible leak. When the sensors detect a leak, the terminal transmits its stationary position data and its status data, which may contain for instance the text "gas leak" and a picture of the leaking spot, to an application according to the

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invention. The picture is obtained by installing, in connection with the terminal device, for instance a known digital image processing or video technical application. The transmission and distribution of the picture is realized for example in the MMS message format. The position data transmitted in the same format can be for instance
5      a map image provided with a dot that points the current location.

As is known in the prior art, a similar defect can be detected by using a dedicated surveillance method especially designed for the target in question. The arrangement according to the invention eliminates the need for a dedicated surveillance method. In addition, the processing of the notice of defects is automated by means of the
10     arrangement according to the invention.

The position and status data transmitted by the terminal 301, which data in this preferred embodiment of the invention is typically of the format: <position data>"gas leak"[picture], is received 302 in the reception and redistribution channel and stored in the data storage 303 for further processing, observation, analysis and/or
15     registration. Typically the data storage 303 also contains information as to what type the employed terminals represent and what technique and protocol they use. In this embodiment, said data information can for example define that the message is received from a terminal in the WLAN (Wireless Local Area Network) and distributed through the GSM network to a terminal of a given type.

20     Also processing rules are stored in the data storage 303. The processing rules that are made by the management application 304 contain instructions for processing both the position data and the text and picture elements of the status data of the message. The text element "gas leak" in the status data indicates the quality of the defect, and the position data tells the location of the defective point. On the basis of
25     this information, an inquiry or search is made in the data storage 303 in order to find the respective repair patrols in the area in question. On the basis of the status data, there is obtained for instance information of the repair patrol of the maintenance firm in charge of exactly the area or device in question. When the final receiver of the message is found out, the message is sent through the redistribution channel 302
30     to the chosen receiver 305. The receiving repair patrol receives notice of the location and defect, and also a picture from the site. The picture transmits valuable extra information, because the receiver sees immediately whether the leak is small or whether a large amount of gas is leaking, and is able to make preparations to the required arrangements in advance.

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In the embodiment illustrated in figure 3, in order to find a suitable receiver, the data storage 303 contains information of possible receivers. Possible repair patrols can be included in the data storage 303, arranged both by area and further by units (private enterprises). One record in the data storage may contain for instance information of

5    the field, employee, employer and area, in order to find the correct receiver/receivers on the basis of the position and status data. Advantageously a given record can be set as passive in the data storage for instance for the duration of vacations, or when a given receiver cannot receive new tasks owing to other responsibilities. The data storage 303 may contain information of an area specifically served by the receivers,

10   or even of the current locations of the receivers. The latter arrangement is preferably realized so that the current active locations of the mobile employees are updated into the data storage 303. According to the invention, this is realized so that the mobile phone of the employee in question sends its position and status data 306 to the arrangement according to the invention. If a separate data storage 307 should be

15   kept, the transmission of the position data can be realized for example so that the data storage 303 according to the invention and the data storage 307 normally registering the operations of the employees, which data storage 307 is illustrated by dotted lines in figure 3, are synchronized. As a consequence, the latest modified information is updated between said databases. Thus both databases 303, 307 always

20   contain only the latest information, and changes need to be made in either one of said databases only.

In this embodiment, the receiver 305 must further send an acknowledgement message after receiving for instance a notice of defect. Said acknowledgement of the receiver is stored in the data storage 303, where the various steps of the working

25   process can be followed. If the receiver 305 is not reached, or if he does not acknowledge the message within a given period of time, the message is transmitted, according to the processing rules, to the next receiver, and the primary receiver obtains notice to that effect.

Another practical example according to the preferred embodiment 3 could be a given

30   device that sends to the system according to the invention a notice of a change in its status data; said notice could be for instance a message indicating a drop in the pressure: <position data><device identifier>"pressure=0.4". The system receives the message through the reception and redistribution channel 302 and records it in the data storage 303. By means of the management application 304, in the system there

35   has earlier been recorded a redistribution rule, according to which, in case the receiver is particularly said device 301, the value of the pressure reading is checked

in the status element of the message by comparing it with a predetermined value. If the pressure reading is below a predetermined alarm limit, the nearest repair patrol is looked up and the pressure reading is redistributed to the found repair patrol. The reception and redistribution channel 302 identifies the device in question as said device 301 and detects that the pressure is below alarm limit (1 bar), and consequently an inquiry is made in the data storage 303 in order to find out the locations of currently working free repair patrols. The inquiry can be realized for instance according to the MPTP protocol, by a location inquiry (?LOC), which can be answered, for instance by using the Benefon navigation telephone, either automatically or manually by a !<LOC_<position data> message.

After finding out the location of the repair patrols, the reception and redistribution channel 302 calculates the distances between the device 301 that transmitted the message and the repair patrols. When the nearest repair patrol is found, the system sends the position data and pressure data of the defective device to said repair patrol 305. The repair patrol acknowledges the message as received for example by a simple "alarm OK" message 306. The system receives said message through the reception and redistribution channel 302 and makes notice in the data storage 303 that said repair patrol is occupied, so that it cannot receive other alarms.

By using their navigation telephone, the repair patrol locates the defective device. After the device is repaired, the repair patrol sends the system notice of a successful repair operation. The system receives the message in the reception and redistribution channel 302, records the information in the data storage 303 and writes in the data storage 303 that said repair patrol is free to receive new notices of defects.

Another practical example according to an embodiment illustrated in figure 3 relates to reporting of the weather conditions. Preferably a monitor or an indicator observes the weather phenomena and changes in those. The device monitoring the weather can be an immobile device, such as surface observing station, or a mobile device, such as a radio- or a dropsonde including small probes for measurements and observations and a radio transmitter attached for example to a balloon or a parachute. The device monitoring the weather 301 may send a message by certain time intervals and/or as a response to a certain observed event. The message may contain position, description, estimated speed, size or other relevant information related to the phenomena.

The reception and redistribution channel 302 identifies the monitoring device in question 301 and processes the information, which may be a storm signal or

warning, change in wind direction, etc. On the basis of the received information an inquiry is made in the data storage 303 in order to find appropriate receivers, such as other weather monitoring devices, weather stations, authorities or inhabitants within certain area influenced by the phenomena or within estimated area influenced by the

5   advanced weather condition. After finding the receivers, the message is sent in predetermined form, through the redistribution channel 302 to the receivers. Some weather conditions may be observed so, that in certain intervals some information is recorded in the database 303 for statistical data or some corresponding record. This recorded statistical data can then be further used and modified by those, who have

10  the access to the database 303.

Another preferred embodiment of the invention is illustrated in figure 4. According to this embodiment, the system is used for instance when observing animals, their living areas, territories and tracks. In this second preferred embodiment of the invention, the mobile terminal 401 transmitting position and status data is capable of

15  producing its current position data. When the user detects for instance a special bird, he may record a voice sample in his device and transmit the status data in the format "Eurasian Bittern"[voice sample]. The message may contain only the voice sample, or added further data, for instance in connection with a butterfly observation, it may include a link to the www pages containing information of said species. The user

20  sends the status data and his position coordinates to a reception channel 402 according to the invention.

The message containing the position and status data is stored in the data storage 403, where all received information can be recorded. Information can also be recorded only in suitable elements, for instance so that a voice sample of a given species is

25  only recorded once and not separately in connection with every observation. Thus, on the basis of said data of the data storage 403 defined by the management application 404, it is possible even later to study for example where certain targets where observed, in which season and how often. When desired, the data storage 403 makes statistics of all received observations, and these statistics can also be utilized

30  later on. This means a considerable help for instance in bird monitoring and watching and makes it possible to carry out observations over a longer period of time. It is an easy method to produce reliable and even scientifically relevant statistics.

The reception and redistribution channel 402 makes for example an inquiry to the

35  user database on the basis of the received position coordinates. In the user database, there is listed everybody who wants the information of bird observations. A

respective transmission for all interested parties could also be made as a group text message, but in that case the transmitter is charged separately for every sent message, although everybody does not necessarily want or need the observation in question. According to a preferred embodiment of the invention, it could be possible to further select, among the interested receivers of bird observations, those who want this specific piece of information. Part of the receivers want to receive the information on the basis of the position data, in order to be able to locate and observe the rare species themselves. Part of the receivers wish to get information of certain species only. In addition, some information collecting parties may wish to receive all information concerning observations, or for instance all information concerning certain species. All detailed instructions and rules regarding the processing are defined by means of the management application 404 and stored in the data storage 403.

The processing of position and status data takes place in the reception and redistribution channel. The processing can be for instance a database inquiry that processes, on the basis of the processing rules, a list of receivers 406a, 406b, to whom the observation is retransmitted through the redistribution channels 405a, 405b. In this embodiment, the redistribution channel 405a transmits the messages further to the receivers through a cellular network, for instance to a SMS (short message service) center according to a given protocol through a gateway. Then the redistribution channel 405b directs the messages to the IT network terminal to be recorded in a given format. The fact that the reception and redistribution channel contains several elements 402, 405a, 405b means that it is capable of receiving, processing and redistributing many types of information from various transmitters to many different types of receivers. The data storage 403 contains technical information of the receivers and transmitters, of the employed formats and protocols, as well as other user specific and application specific information.

In the embodiment of figure 4, the message is transmitted for example in the MMS format to several receivers at the same time. In the processing rules, it has now been defined that the only task is to transmit the message further; in this embodiment, confirmations or acknowledgements are not expected from the receivers.

According to a preferred embodiment of the invention, the position data of animal observations are collected as official statistics in the data storage 406b for further processing. Now the users who have a right to read said data storage can, when they so desire, obtain knowledge of the collected observations. These statistics can be used later for instance when observing the behavior of animals, their occurrence

density or mobility. The statistics may also be useful for scientific purposes. This embodiment differs from the one illustrated in figure 4 in that several position and status data transmissions are received possibly from several different devices, and in that the receiver can only be one data storage.

5    Another example of a preferred embodiment according to figure 4 is to inform specified receivers about pests or noxious animals. The observer, or the sender of the information at the device 401, may be for example a farmer or some official authority, like the Ministry of Agriculture. The sender device 401 transmits via the reception channel 402 besides the position data, also for example the species, an

10   estimated size of an observed population, a direction and a speed of a propagation of the observed animals. Some or all of the data is recorded in the database 403. There is also a list of possible receivers or some indication of them in the database 403. To find out the appropriate one(s) of them, an inquiry is made in the database 403 on the basis of received data. When the receiver(s) are found out, distribution of the

15   received data or some parts of it can be done through the redistribution channels 405a, 405b according to a preferred embodiment of the invention. In this example of a preferred embodiment it is useful to send acknowledgements and quidelines or recommendations, what the receivers can do or have done to prevent for example crop damages.

20   Another example of a preferred embodiment according to figure 4 is a motorist needing help or transmitting data or information observed on a way. The motorist may 401 send a typical message containing position and status data to the reception channel 402. Status data may be for example a request for towing. On the basis of this status data an inquiry is made in the data storage 403 to find the closest

25   available towing service. When the nearest towing service is found, the request for towing is transmitted with the position data to the found receiver 406a through the corresponding redistribution channel 405a in a predetermined form. The receiver 406a sends an acknowledgement of the received message to the system according to a preferred embodiment of the invention. Due to this acknowledgement the system

30   knows that this specific receiver is unable to take any further messages or requests at the time. After carrying out the requested task, the receiver may send another acknowledgement to inform the system, that the requested task is executed and the receiver is available or valid again.

According to another preferred example a motorist may transmit his current position

35   data and for example a status of a road conditions, such as traffic congestion or jam, to the reception channel 402. On the basis of this data for example motorists on

certain area or approaching certain area according to the transmitted position data
and those of the motorists, found by the transmitted position data, who according to
the transmitted status data are interested of this kind of information, can be found.
The road conditions are then distributed through the redistribution channel 405a to
the found receivers. If no receivers are found, the message may be recorded only to
the data storage 403, transmitted to some other data storage 406b through the
redistribution channel 405b or just deleted, if the data in the message is not
important. Besides the statistical information, the data storages may include
replaceable information, which is updated according a preferred embodiment of the
present invention. Updating process deletes the old information and saves only the
latest one.

One preferred embodiment of the present invention relates to the requested
operations to be executed on a certain area. For example an employee of a timber
mill may send a request for operation, such as thinning or cleaning with certain
position data, such as coordinates or a position and radius of operable area.
According to the preferred embodiment of the present invention the request is
processed and the closest available machinery and/or personnel is detected. The
request for operation is then transmitted through the redistribution channel to the
detected receiver(s). While carrying out or executing such large tasks, the certain
stages or steps of the action are informed to the system according to a preferred
embodiment of the invention. These informed steps are typically recorded in certain
data storage means. From the recorded steps the current stage of the action can be
monitored.

A third preferred embodiment of the invention is illustrated in figure 5. The device
501 transmitting the position and status data is mobile, for instance a gas tank
circulating on a building site or a carriage proceeding on a conveyor band. Typically
the number of said devices that transmit position and status data is limited, which
means that each device can have an own identifier that is transmitted in connection
with the status data. The device could transmit the status data for example in the
form <position coordinates><device identifier>"empty", when the gas tank is empty,
or <position coordinates><device identifier>"bearings", when a defect with bearings
is detected in the conveyor carriage. The message is transmitted to the reception and
redistribution channel 502 and recorded in the data storage 503 for instance device
by device, in which case for example the maintenance history of a given device is
easily followed.

In the management application 504, the processing rules can be defined so that in the reception and redistribution channel 502, there is chosen, on the basis of the notice of defects given in the status data, the procedure code to be run next, and on the basis of the device identifier there is chosen the location to which the messages are retransmitted.

From the reception and redistribution channel 502, the message is transmitted to a machine, device or program 505 that manages such logistic resources that are used for repairing the defect in question. Said device or program transmits a reception acknowledgement to the data storage 503 according to the invention and takes care of the necessary procedures according to the received position and status data. If the receiving device 505 is not capable of receiving the message or otherwise performing the required tasks, it transmits a notice of defect to the reception and redistribution channel 502. The processing rules include instructions for further processing the message in these situations.

One preferred embodiment of the invention is used to inspect for example certain environmental areas. For example a forest officer may report the state of the environment, which typically are visible changes, such as floods. The forest officer may send the position data along or the position may be identified according to the sender, like the forest officer on the basis of his sphere of responsibilities. Again the receivers are found on the basis of the report and the information is transmitted to them through the redistributing channel. There may be for example automatized dams, which can be controlled and driven by messages or commands transmitted according to the preferred embodiment of the invention.

According to a preferred embodiment of the invention the location and status data of eldery people, people with disabilities or people needing help, is transmitted to a nursing or rescue unit. A person possibly needing help wears a wireless transmitter, which is capable of sending the location and status data, such as pulse, perspiration and activity of the person wearing the transmitter. The transmitter may send the data in certain time intervals for controlling, or only for example when the measured status data is changed dramatically, or when the position data shows that the person is out of some predetermined zone. On the basis of the transmitted data an inquiry is made in the data storage in order to find the possible receivers, such as closest available nursing staff, rescue patrol or relative. When the receivers and their current positions are verified, the message is transmitted to them through the redistribution channel. Typically in this embodiment the receiver sends an acknowledgement indicating that he has received the message. Another exemplary embodiment is to

use the position data transmitted by the mobile, wireless transmitter for tracking of patients or people needing help.

According to another preferred embodiment a status data of a patient and/or a position data of an ambulance is transmitted through the reception channel to the data storage. On the basis of the inquiry executed in a data storage the nearest available hospital and/or medical specialists are found out. The sender of the message receives the message through the redistribution channel containing information about the found receiver(s) with available hospital's address data and so on. Also, the found receiver(s) typically receive the message through the redistribution channel containing information about the approaching ambulance and its position and about the patient's condition. This way the best possible and suitable hospitals, medical doctors, medical specialists and/or attendants are found quickly and informed automatically. The receiver(s) found out from the data storage can be searched on the basis of measured injuries, current location of the patient, working hours of the attendants, and so on. In the hospital, the received message may be further processed. For example on the basis of the status data including examined information of the patient, can be used for checking whether a suitable blood donor(s) can be found out from the hospital's database. The hospital receiving the message may transmit the message further for example to the nearest available and suitable blood donor(s) found out according to a preferred embodiment of the invention. Further, the hospital may respond to the message received by sending back an acknowledgement to be transmitted to the sender of the original message. This acknowledgement advantageously includes further medical information and instructions.

In the previous specification, a number of preferred embodiments of the invention have been described. However, the invention is not restricted to these special cases exclusively, but it may be used in all applications where messages containing position and status data are processed, recorded and/or retransmitted.

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## Claims

1.    A method for processing and redistributing position and status data, **characterized** in that the method comprises steps of:
- receiving a message containing position and status data in a reception channel,
- recording the received position and status data at least partly in a data storage,
- processing the message on the basis of processing rules describing processing of messages for defining at least one receiver from the data storage on the basis of at least one of the position and status data, and
- transmitting the position and status data through a redistribution channel to at least said one receiver.

2.    A method according to claim 1, **characterized** in that the position data is presented according to one of the following: the MPTP (Mobile Phone Telematics Protocol), the SLoP (a Simple Text Format for the Spatial Location Protocol), the MLP (Mobile Location Protocol) or the MPP (Mobile Positioning Protocol).

3.    A method according to claim 1, **characterized** in that the status data contains information in the form of: text, image, sound, moving picture, multimedia and/or hypertext.

4.    A method according to claim 1, **characterized** in that it comprises a step of starting the processing of the received message on the basis of at least one of a transmitter data and a piece of information contained in the message.

5.    A method according to claim 1, **characterized** in that it comprises a step of forming processing rules by means of a management application for defining how messages are processed.

6.    A method according to claim 5, **characterized** in that it comprises a step of processing received messages in a reception and redistribution channel on the basis of the processing rules.

7.    A method according to claim 1, **characterized** in that it comprises a step of choosing the receiver on the basis of at least one of the position and status data of the transmitting device.

8.    A method according to claim 1, **characterized** in that it comprises a step of choosing the receiver from the data storage on the basis of at least one of the position and status data of the receiver.

9.   A method according to claim 1, **characterized** in that it comprises a step of choosing the receiver on the basis of at least one of the position and status data of the message transmitting device and on the basis at least one of the position and/or status data of the receiver.

10.   A method according to claim 1, **characterized** in that it comprises steps of receiving notices connected to earlier messages and recording the notices in the data storage.

11.   An arrangement for processing and redistributing position and status data, **characterized** in that the arrangement comprises

-    means for receiving a message containing position and status data in a reception channel,
-    means for recording the position and status data at least partly in a data storage,
-    means for processing the message on the basis of processing rules describing processing of messages for defining at least one receiver from the data storage on the basis of at least one of the position and status data, and
-    means for redistributing the position and status data to the defined receivers through the redistributing channel.

12.   An arrangement according to claim 11, **characterized** in that for representing the received position data, there is used a format according to one of the following: the MPTP (Mobile Phone Telematics Protocol), the SLoP (a Simple Text Format for the Spatial Location Protocol), the MLP (Mobile Location Protocol) or the MPP (Mobile Positioning Protocol).

13.   An arrangement according to claim 11, **characterized** in that in order to transmit received status data, there is used an MMS (Multimedia Messaging Service) configuration.

14.   An arrangement according to claim 11, **characterized** in that it comprises means for recording various steps of the position and status data and notices connected thereof in the data storage.

15.   An arrangement according to claim 11, **characterized** in that by means of a management application, there are formed processing rules for processing received messages.

16.    An arrangement according to claim 11, **characterized** in that the reception and redistribution channel comprises means for processing the messages on the basis of the processing rules.

17.    An arrangement according to claim 11, **characterized** in that the receiver chosen on the basis of the processing rules is one of the following: a terminal device, a database, a data system, a device or a program.

18.    A program for processing and redistributing position and status data, **characterized** in that the program contains
-       executable program means for receiving a message containing position and status data in the reception channel,
-       executable program means for recording the position and status data at least partly in the data storage,
-       executable program means for processing the message on the basis of processing rules describing processing of messages for defining at least one receiver from the data storage on the basis of at least one of the position and status, and
-       executable program means for redistributing position and status data to the defined receivers through a redistributing channel.
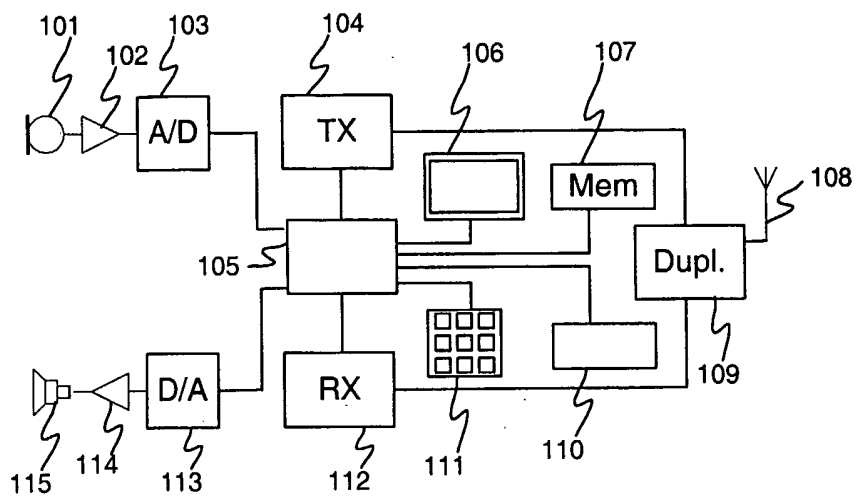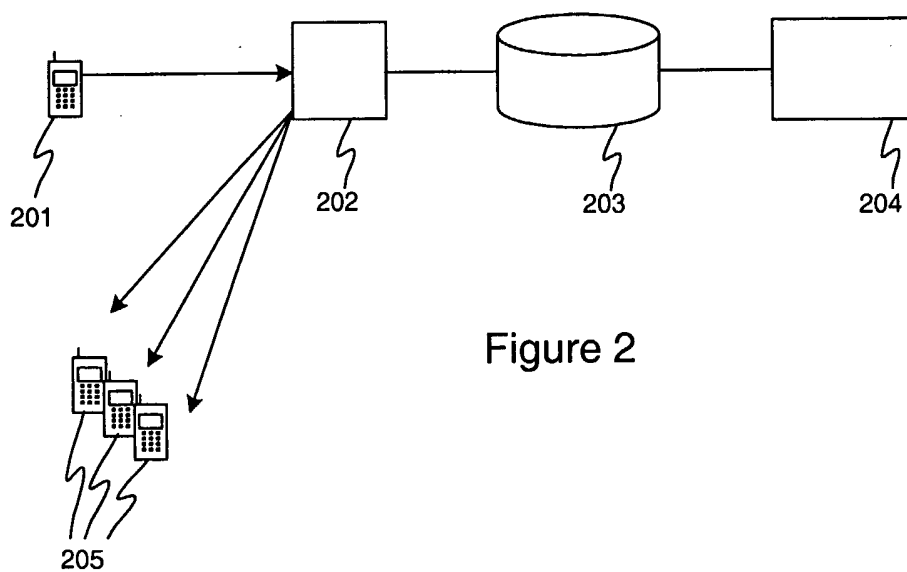
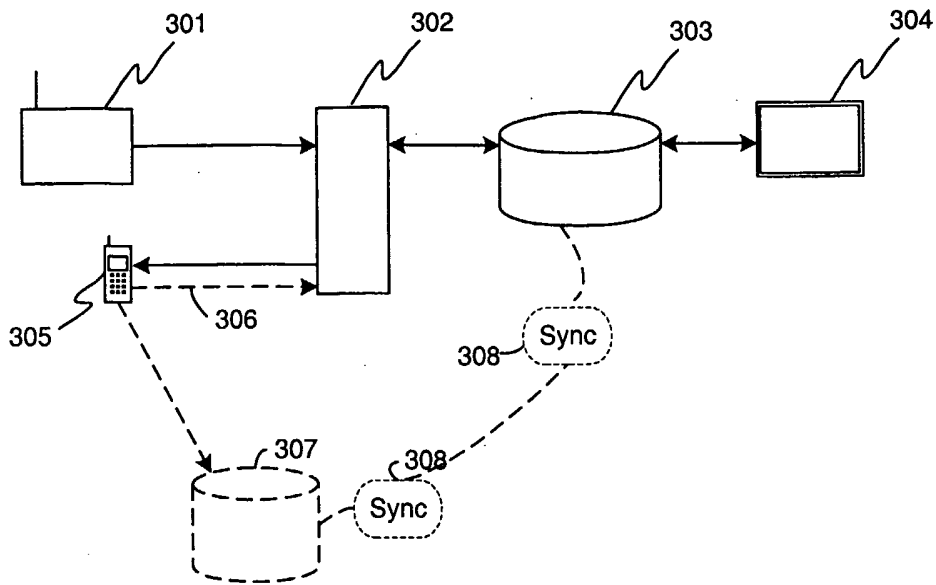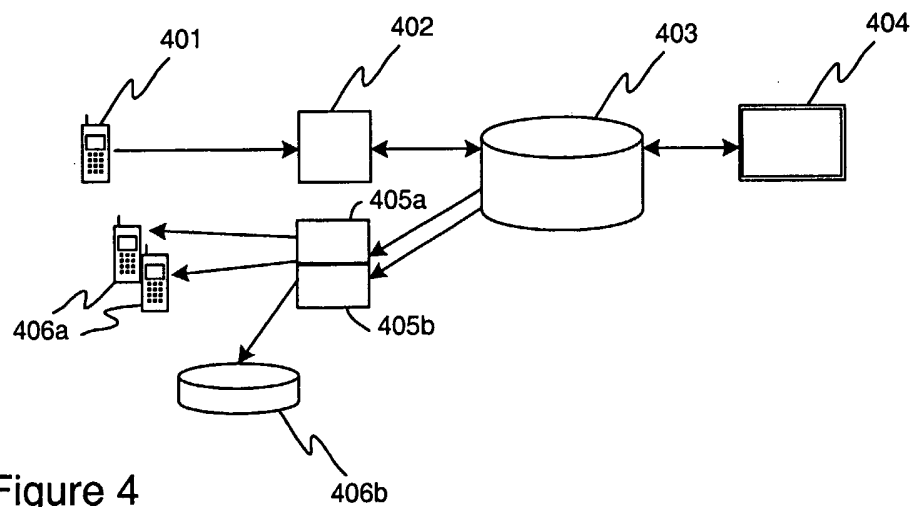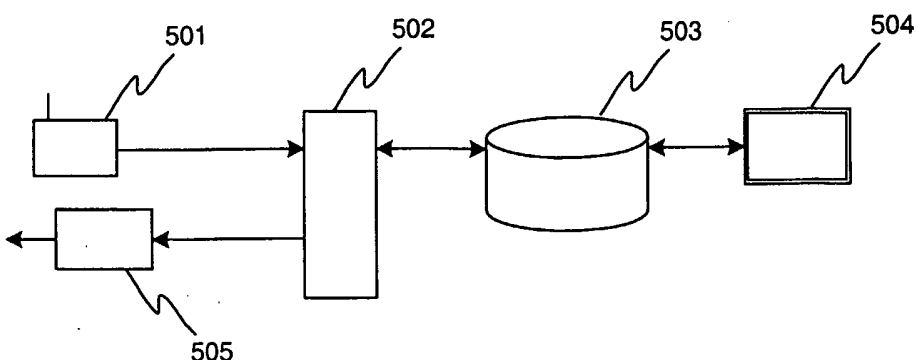1/2



Figure 1. Prior Art



Figure 2

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Figure 3



Figure 4



Figure 5

# INTERNATIONAL SEARCH REPORTT

| A. CLASSIFICATION OF SUBJECT MATTER |
|---|

IPC7: G01S 5/00, H04Q 7/22, H04Q 7/38
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: G01S, H04Q

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 DATA,PAJ

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