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**POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO**

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

 Practitioners associated with the Customer Number:

93892

OR

 Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:



The address associated with Customer Number:

93892

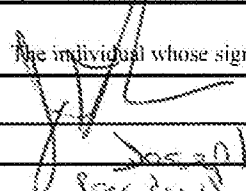
OR

<input type="checkbox"/> Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:

Location Based Technologies, Inc.  
38 Discovery Suite 150  
Irvine, CA 92618**A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.****SIGNATURE of Assignee of Record**

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1/19/11
Name	Joseph Scalis	Telephone	714583-867
Title	President		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

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.

**STATEMENT UNDER 37 CFR 3.73(b)**

Applicant/Patent Owner: Location Based Technologies, Inc.

Application No./Patent No.: 11/969,905 Filed/Issue Date: January 6, 2008

Titled: **APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE**

Location Based Technologies, Inc., a Corporation  
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

- 1.  the assignee of the entire right, title, and interest in;
- 2.  an assignee of less than the entire right, title, and interest in  
(The extent (by percentage) of its ownership interest is \_\_\_\_\_ %); or
- 3.  the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A.  An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 020390, Frame 0131, or for which a copy therefore is attached.

**OR**

B.  A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

2. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

3. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.

Additional documents in the chain of title are listed on a supplemental sheet(s).

As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Christopher Lattin/  
Signature

January 24, 2011  
Date

Christopher W. Lattin/Reg. No. 56064  
Printed or Typed Name

Attorney of Record  
Title

This collection of information is required by 37 CFR 3.73(b). 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 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.

IPR2020-01192

## Privacy Act Statement

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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

LBTECH.012A

**Declaration and Power of Attorney for Patent Application**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**"APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE"**

the specification of which  is attached hereto.  
 was filed on \_\_\_\_\_  
Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s) (Number/Country/Date Filed/Priority Claims: Yes/No)

No \_\_\_\_\_

I hereby claim the benefit under Title 35, United States Code, Section 120, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a), which occurred between the filing date of the prior application and the national or PCT international filing date of this application (list application Serial No./Filing Date/Status):

Prior US/PCT Application(s) (Number/Date Filed/Priority Claims: Yes/No)

No \_\_\_\_\_

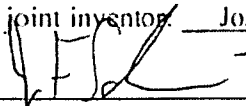
LBTECH.012A

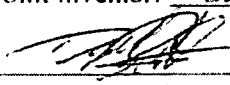
POWER OF ATTORNEY: As a named inventor, I hereby revoke any previous power of attorney in the subject application, and hereby appoint the following to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, with full power of substitution and revocation to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected herewith.

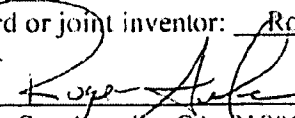
USPTO Customer No. 70,515  
Law Office of Robert E. Kasody, Professional Corporation  
6601 Center Drive West, Suite 500  
Los Angeles, CA 90045

SEND CORRESPONDENCE TO: DIRECT TELEPHONE CALLS TO:  
Law Office of Robert E. Kasody, Professional Corp. Name: Robert E. Kasody  
6601 Center Drive West, Suite 500 Telephone: (310) 348-8195  
Los Angeles, CA 90045

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

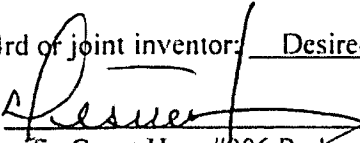
Full name of sole or 1st or joint inventor: Joseph F. Scalisi  
Inventor's Signature:  Dated: Jan 15 2008  
Residence: 21520 Yorba Linda Blvd., G357, Yorba Linda, CA, 92887 Citizenship: USA  
Post Office Address: 21520 Yorba Linda Blvd., G357, Yorba Linda, CA, 92887

Full name of sole or 2nd or joint inventor: David Butler  
Inventor's Signature:  Dated: 15/1/08  
Residence: 9A East Butts Road, Rugeley, Staffordshire WS152LU England Citizenship: UK  
Post Office Address: 9A East Butts Road, Rugeley, Staffordshire WS152LU England

Full name of sole or 3rd or joint inventor: Roger B. Anderson  
Inventor's Signature:  Dated: 1-15-08  
Residence: 928 Othello St., Arcadia, CA, 91006 Citizenship: USA  
Post Office Address: 713 W. Duarte Rd. #G-170, Arcadia, CA 91007

LBTECH.012A

Full name of sole or 4rd or joint inventor: Desiree Mejia


Inventor's Signature: 

Dated: 10 JAN 2008

Residence: 1874 S. Pacific Coast Hwy #906 Redondo Beach, CA 90277 Citizenship: USA

Post Office Address: 1874 S. Pacific Coast Hwy #906 Redondo Beach, CA 90277

Full name of sole or 5th or joint inventor: Michael L. Beydler

Inventor's Signature: 

Dated: 1-15-2008

Residence: 2575 McCabe Way #230, Irvine, CA. 92614

Citizenship: USA

Post Office Address: 2575 McCabe Way #230, Irvine, CA, 92614

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT**

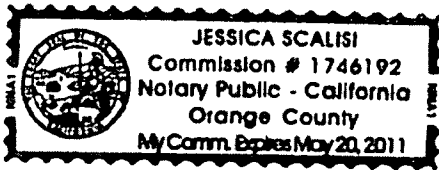
State of California

County of Orange }

On 1.18.08 before me, Jessica Scalisi, Notary Public  
Date Here Insert Name and Title of the Officer

personally appeared Desirée Mejia, Joseph Scalisi,  
Name(s) of Signer(s)  
Michael Beydler, David Morse

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



Place Notary Seal Above

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Jessica Scalisi  
Signature of Notary Public

**OPTIONAL**

*Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.*

**Description of Attached Document**

Title or Type of Document: \_\_\_\_\_

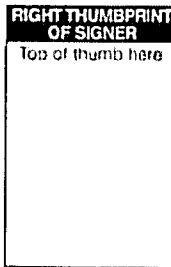
Document Date: \_\_\_\_\_ Number of Pages: \_\_\_\_\_

Signer(s) Other Than Named Above: \_\_\_\_\_

**Capacity(ies) Claimed by Signer(s)**

Signer's Name: \_\_\_\_\_

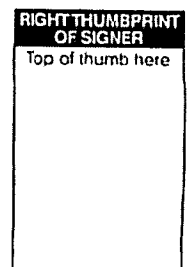
- Individual
- Corporate Officer — Title(s): \_\_\_\_\_
- Partner —  Limited  General
- Attorney in Fact
- Trustee
- Guardian or Conservator
- Other: \_\_\_\_\_



Signer Is Representing: \_\_\_\_\_

Signer's Name: \_\_\_\_\_

- Individual
- Corporate Officer — Title(s): \_\_\_\_\_
- Partner —  Limited  General
- Attorney in Fact
- Trustee
- Guardian or Conservator
- Other: \_\_\_\_\_



Signer Is Representing: \_\_\_\_\_

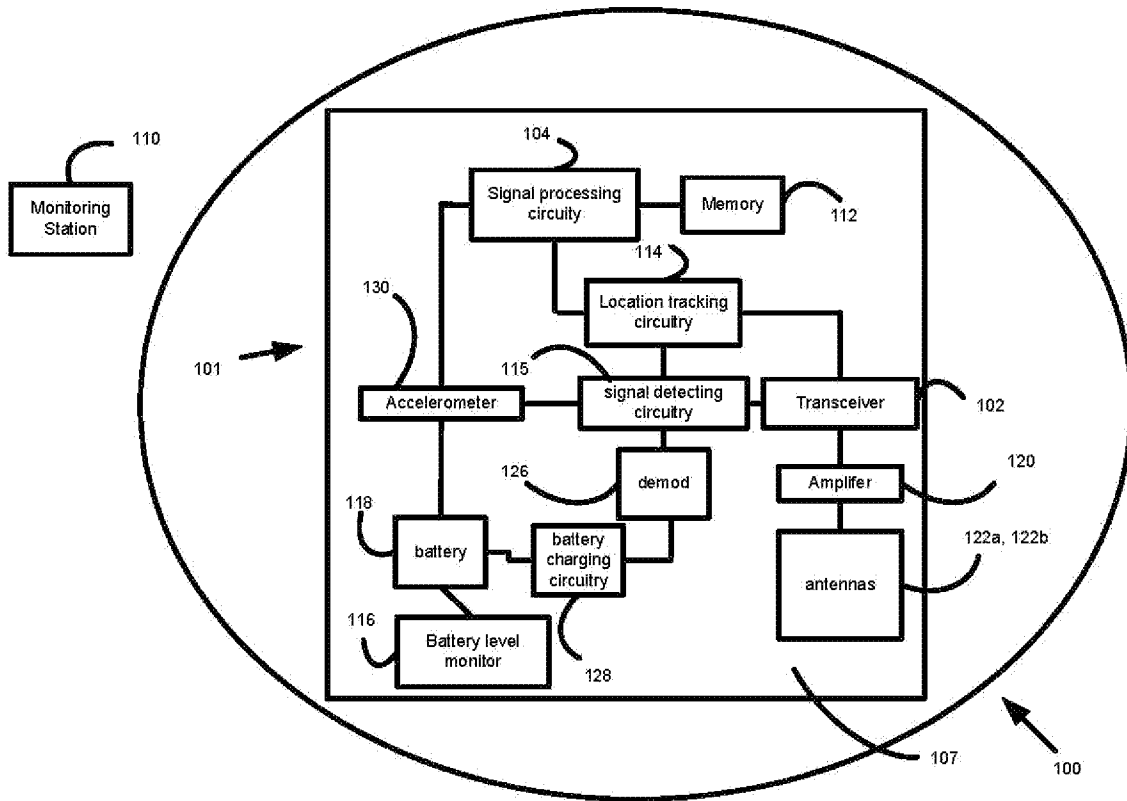


Figure 1



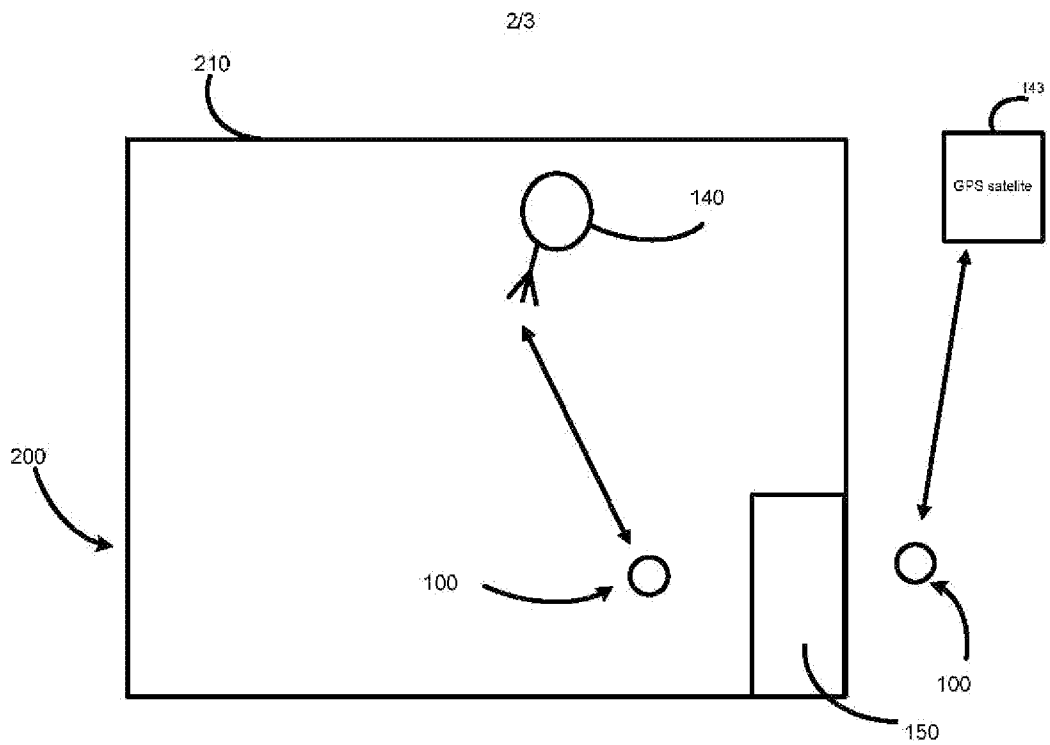


Figure 2

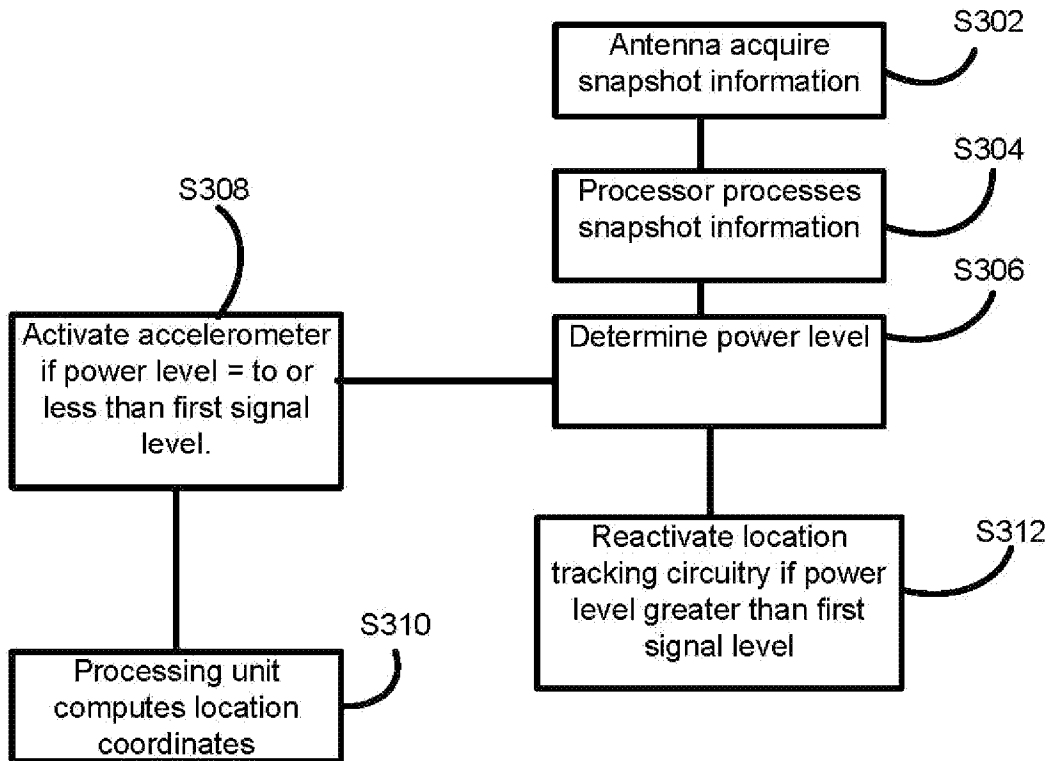


Figure 3

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE			
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi			
<b>Filer:</b>	Christopher W. Lattin			
<b>Attorney Docket Number:</b>	LB1-006USD1			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
Utility filing Fee (Electronic filing)	4011	1	95	95
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	2202	4	30	120
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>650</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	11902399
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Christopher W. Lattin
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	23-JAN-2012
<b>Filing Date:</b>	
<b>Time Stamp:</b>	22:23:27
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$650
RAM confirmation Number	7549
Deposit Account	
Authorized User	

### File Listing:

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

1		LB1006USD1ApplicationasFiled.pdf	157904 3fab6a3b3de5647c06436b6e76c8f2d1dc12c6a	yes	27
	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Specification		1	20	
	Claims		21	26	
Abstract		27	27		
<b>Warnings:</b>					
<b>Information:</b>					
2	Application Data Sheet	LB1006USD1ADSasFiled.pdf	109696 4f8a4b111ecdb5596a7f046f4afc9748038e0707	no	7
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied ADS fillable form					
3		LB1006USD1DrawingsDeclaration.pdf	461003 ad551a2c44304ee6b3bbe7e35deb5469243cbaf1	yes	10
	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Power of Attorney		1	3	
	Oath or Declaration filed		4	7	
Drawings-only black and white line drawings		8	10		
<b>Warnings:</b>					
<b>Information:</b>					
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<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			765361		

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**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.**

# APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

## Related Applications

**[0001]** This application is a Divisional of, claims priority to, and herein incorporates in its entirety US patent application Serial No. 11/969,905 filed January 6, 2008.

**[0002]** This application also incorporates by reference in their entirety: U.S. patent application Serial No. 11/753,979 filed on May 25, 2007, entitled "Apparatus and Method for Providing Location Information on Individuals and Objects Using Tracking Devices"; US patent application Serial No. 11/933,024 filed on October 31, 2007, entitled "Apparatus and Method for Manufacturing an Electronic Package", US patent application Serial No. 11/784,400 filed on April 5, 2007, entitled "Communication System and Method Including Dual Mode Capability"; US patent application Serial No. 11/784,318 filed on April 5, 2007, entitled "Communication System and Method Including Communication Billing Options"; and US patent application Serial No. 11/935, 901 filed on November 6, 2007, entitled "System and Method for Creating and Managing a Personalized Web Interface for Monitoring Location Information on Individuals and Objects Using Tracking Devices."

## Background of the Invention

Field of the Invention

**[0003]** The invention relates generally to the field of location and tracking communication systems. More particularly, the present invention relates in one embodiment



to an accelerometer incorporated as part of portable electronic tracking device for individuals and objects to improve monitoring by a wireless location and tracking system and/or wireless communication system (WCS).

#### Description of Related Technology

**[0004]** Accelerometers are conventionally integrated into electronics systems that are part of a vehicle, vessel, and airplane to detect, measure, and monitor deflections, vibrations, and acceleration. Accelerometers, for example, may include one or more Micro Electro-Mechanical System (MEMS) devices. In particular, MEMS devices include one or more suspended cantilever beams (e.g., single-axis, dual-axis, and three-axis models), as well as deflection sensing circuitry. Accelerometers are utilized by a multitude of electronics manufacturers.

**[0005]** For instance, electronics gaming manufacturers exploit an accelerometer's deflection sensing capability, for instance, to measure device tilt and control game functionality. In another instance, consumer electronics manufacturers, e.g., Apple, Ericsson, and Nike, incorporate accelerometers in personal electronic devices, e.g., Apple iPhone, to provide a changeable screen display orientation that toggles between portrait and landscape layout window settings; to manage human inputs through a human interface, e.g., Apple iPod® touch screen interface; and to measure game movement and tilt, e.g., Wii gaming remotes. Still others including automobile electronics circuitry manufacturers utilize MEMS accelerometers to initiate airbag deployment in accordance with a detected collision severity level by measuring negative vehicle acceleration.

**[0006]** Other electronics manufacturer products, e.g., Nokia 5500 sport, count step motions using a 3D accelerometer, and translate user information via user's taps or shaking motion to select song titles and to enable mp3 player track switching. In another instance, portable or laptop computers include hard-disk drives integrated with an accelerometer to detect displacement or falling incidents. For instance, when a hard-disk accelerometer detects a low-g condition, e.g., indicating free-fall and expected shock, a hard-disk write feature may be temporarily disabled to avoid accidental data overwriting and prevent stored data corruption. After free-fall and expected shock, the hard-disk write feature is enabled to allow data to be written to one or more hard-disk tracks. Still others including medical product manufacturers utilize accelerometers to measure depth of Cardio Pulmonary Resuscitation (CPR) chest compressions. Sportswear manufacturers, e.g., Nike sports watches and footwear, incorporate accelerometers to feedback speed and distance to a runner via a connected iPod® Nano.

**[0007]** Still others including manufacturers of conventional inertial navigation systems deploy one or more accelerometers as part of, for instance, on-board electronics of a vehicle, vessel, train and/or airplane. In addition to accelerometer measurements, conventional inertial navigation systems integrate one or more gyroscopes with the on-board electronics to assist tracking including performing various measurements, e.g., tilt, angle, and roll. More specifically, gyroscopes measure angular velocity, for instance, of a vehicle, vessel, train, and/or airplane in an inertial reference frame. The inertial reference frame, provided, for instance, by a human operator, a GPS receiver, or position and velocity measurements from one or more motion sensors.

**[0008]** More specifically, integration of measured inertial accelerations commences with, for instance, original velocity, for instance, of a vehicle, vessel, train, and/or airplane to yield updated inertial system velocities. Another integration of updated inertial system velocities yields an updated inertial system orientate, e.g., tilt, angle, and roll, within a system limited positioning accuracy. In one instance to improve positioning accuracy, conventional inertial navigation systems utilize GPS system outputs. In another instance to improve positioning accuracy, conventional inertial navigation systems intermittently reset to zero inertial tracking velocity, for instance, by stopping the inertial navigation system. In yet other examples, control theory and Kalman filtering provide a framework to combine motion sensor information in attempts to improve positional accuracy of the updated inertial system orientation.

**[0009]** Potential drawbacks of many conventional inertial navigations systems include electrical and mechanical hardware occupying a large real estate footprint and requiring complex electronic measurement and control circuitry with limited applicability to changed environmental conditions. Furthermore, many conventional inertial navigation system calculations are prone to accumulated acceleration and velocity measurement errors. For instance, many conventional inertial navigations accelerations and velocity measurement errors are on the order of 0.6 nautical miles per hour in position and tenths of a degree per hour in orientation.

**[0010]** In contrast to conventional inertial navigation systems, a conventional Global Positioning Satellite (GPS) system uses Global Positioning Signals (GPS) to monitor and track location coordinates communicated between location coordinates monitoring satellites and an

individual or an object having a GPS transceiver. In this system, GPS monitoring of location coordinates is practical when a GPS transceiver receives at least a minimal GPS signal level. However, a minimal GPS signal level may not be detectable when an individual or object is not located in a skyward position. For instance, when an individual or object carrying a GPS transceiver enters a covered structure, e.g., a garage, a parking structure, or a large building, GPS satellite communication signals may be obstructed or partially blocked, hindering tracking and monitoring capability. Not only is a GPS transceiver receiving a weak GPS signal, but also the GPS transceiver is depleting battery power in failed attempts to acquire communications signals from one or more location coordinates monitoring satellites, e.g., GPS satellites, or out-of-range location coordinates reference towers. Furthermore, weak GPS communication signals may introduce errors in location coordinates information.

**[0011]** In summary, electronic tracking device and methodology is needed that provides additional advantages over conventional systems such as improved power management, e.g., efficient use of battery power, and provide other improvements including supplementing conventional electronic tracking device monitoring, e.g., increased measurement accuracy of location coordinates of objects and individuals traveling into and/or through a structure, e.g., a partially covered building, a parking structure, or a substantially enclosed structure, such as a basement or a storage area in a high-rise office building.

### **Summary of the Invention**

**[0012]** In a first aspect of the present invention, a portable electronic apparatus for a tracking device is disclosed. The electronic apparatus includes a transceiver, an accelerometer,

and an antenna. The antenna is disposed on the tracking device. The antenna is configured to communicate signal strength to a signal processor associated with the tracking device. In one variant, responsive to the signal strength, a battery management module (e.g., battery monitor) controls electronic components associated with the tracking device. In one variant, an accelerometer performs an acceleration measurement. In one variant, prior or nearby location coordinates associated with the tracking device are utilized or assist to compute current location coordinates information of the tracking device.

**[0013]** In a second aspect of the present invention, a method is disclosed to communicate location coordinates of a first, tracking device. In this method, a transceiver communicates measured signal strength. In response to measured signal strength level, a power management circuitry (e.g., battery monitor) controls power levels associated with the first tracking device to reduce or increase power consumption of a transceiver and its associated circuitry. In one variant, a user defines a first signal level, e.g., a threshold level, to commence accelerometer measurements. In one variant, if a first signal level is detected, an accelerometer measures displacement from prior location coordinates of the first tracking device. In another variant, if a first signal level is detected, an accelerometer measures relative displacement from prior location coordinates of a second tracking device. In yet another variant, if a first signal level is detected, the relative displacement is utilized to compute current location coordinates information of the first tracking device. In another variant, the accelerometer may be activated to measure impacts of an object or an individual to determine if the object or individual may be medical attention (e.g., be injured).

**[0014]** These and other embodiments, aspects, advantages, and features of the present invention will be set forth in part in the description which follows, and in part will become apparent to those skilled in the art by reference to the following description of the invention and referenced drawings or by practice of the invention. The aspects, advantages and features of the invention are realized and attained by means of the instrumentalities, procedures, and combinations particularly pointed out in the appended claims.

### **Brief Description of the Drawings**

**[0015]** FIG. 1 illustrates a schematic of an electronic tracking device in accordance with an embodiment of the present invention.

**[0016]** FIG. 2 illustrates a location tracking system associated with the electronic tracking device and the wireless network in accordance with an embodiment of the present invention.

**[0017]** FIG. 3 illustrates a flow diagram to manage and control circuitry associated with the electronic tracking device of FIGS. 1 and 2 in accordance with an embodiment of the present invention.

### **Detailed Description**

**[0018]** Reference is now made to the drawings wherein like numerals refer to like parts throughout.

**[0019]** As used herein, the terms "location coordinates" refer without limitation to any set or partial set of integer, real and/or complex location data or information such as longitudinal, latitudinal, and elevational positional coordinates.

**[0020]** As used herein, the terms "tracking device" and "electronic tracking device" refer to without, limitation, to any hybrid electronic circuit, integrated circuit (IC), chip, chip set, system-on-a-chip, microwave integrated circuit (MIC), Monolithic Microwave Integrated Circuit (MMIC), low noise amplifier, power amplifier, transceiver, receiver, transmitter and Application Specific Integrated Circuit (ASIC) that may be constructed and/or fabricated. The chip or IC may be constructed ("fabricated") on a small rectangle (a "die") cut from, for example, a Silicon (or special applications, Sapphire), Gallium Arsenide, or Indium Phosphide wafer. The IC may be classified, for example, into analogue, digital, or hybrid (both analogue and digital on the same chip and or analog-to-digital converter). Digital integrated circuits may contain anything from one to millions of logic gates, invertors, and, or, nand, and nor gates, flipflops, multiplexors, etc. on a few square millimeters. The small size of these circuits allows high speed, low power dissipation, and reduced manufacturing cost compared with board-level integration.

**[0021]** As used herein, the terms "data transfer", "tracking and location system", "location and tracking system", "location tracking system", and "positioning system," refer to without limitation to any system, that transfers and/or determines location coordinates using one or more devices, such as Global Positioning System (GPS).

**[0022]** As used herein, the terms "Global Positioning System" refer to without limitation to any services, methods or devices that utilize GPS technology to determine position of a GPS receiver based on measuring a signal transfer time of signals communicated between satellites

having known positions and the GPS receiver. A signal transfer time is proportional, to a distance of a respective satellite from the GPS receiver. The distance between a satellite and a GPS receiver may be converted, utilizing signal propagation velocity, into a respective signal transfer time. The positional information of the GPS receiver is calculated based on distance calculations from at least four satellites to determine positional information of the GPS receiver.

**[0023]** As used herein, the terms "wireless network" refers to, without limitation, any digital, analog, microwave, and millimeter wave communication networks that transfer signals from one location to another location, such as, but not limited to IEEE 802.11g, Bluetooth, WiMax, IS-95, GSM, IS-95, CGM, CDMA, wCDMA, PDC, UMTS, TDMA, and FDMA, or combinations thereof.

#### Major Features

**[0024]** In one aspect, the present invention discloses an apparatus and method, to provide an improved capability electronic tracking device. In one embodiment, the device provides electronic circuitry including an accelerometer to measure location coordinates without requiring GPS signaling. In this embodiment, location coordinates of an electronic tracking device are measured when the electronic tracking device is located in a partially enclosed structure, e.g., a building or parking lot, up to a fully enclosed structure. In one embodiment, the electronic tracking device conserves battery power when the device is partially or fully blocked access to location coordinates from one or more GPS satellites, e.g., a primary location tracking system. In yet another embodiment, accelerometer measures force



applied to the electronic tracking device and provides an alert, message to a guardian or other responsible person. In one embodiment, the alert message includes location coordinates of the electronic tracking device and other information, e.g., magnitude or nature of force, as well as possibility of injury of an object or individual having the electronic tracking device. As described throughout the following specification, the present invention generally provides a portable electronic device configuration for locating and tracking an individual or an object.

#### Exemplary Apparatus

**[0025]** Referring now to FIGS. 1-2 exemplary embodiments of the electronic tracking device of the invention are described in detail. Please note that the following discussions of electronics and components for an electronic tracking device to monitor and locate individuals are non-limiting; thus, the present invention may be useful in other electronic signal transferring and communication applications, such as electronic modules included in items such as: watches, calculators, clocks, computer keyboards, computer mice, and/or mobile phones to locate and track trajectory of movement and current location of these items within boundaries of or proximity to a room, building, city, state, and country.

**[0026]** Furthermore, it will be appreciated that while described primarily in the context of tracking individuals or objects, at least portions of the apparatus and methods described herein may be used in other applications, such as, utilized, without limitation, for control systems that monitor components such as transducers, sensors, and electrical, and/or optical components that are part of an assembly line process. Moreover, it will be recognized that the present invention may find utility beyond purely tracking and monitoring concerns. Myriad of

other functions will be recognized by those of ordinary skill in the art given the present disclosure.

#### Electronic Tracking Device

**[0027]** Referring to FIG. 1, tracking device 100 contains various electronic components 101 such as transceiver 102, signal processing circuitry 104 (e.g., a microprocessor or other signal logic circuitry), and accelerometer 130. In one non-limiting example, the electronic components 101 are disposed, deposited, or mounted, on a substrate 107 (e.g., Printed Circuit Board (PCB)). The PCB 107, for example, may be manufactured from: polyacrylic (PA), polycarbonate (PC), composite material, and arylonitrile-butadiene-styrene (ABS) substrates, blends or combinations thereof, or the like (as described in more detail, in incorporated by reference U.S. patent application Ser. No. 11/933,024 filed on Oct. 31, 2007). The signal processing circuitry 104, in one example, associated with the tracking device 100 configured to store a first identification code, produce a second identification code, determine location coordinates, and generate a positioning signal that contains location data (as described in more detail in incorporated by reference U.S. patent application Ser. No. 11/753,979 filed on May 25, 2007). For instance, the location data includes longitudinal, latitudinal, and elevational position of a tracking device, current address or recent address of the tracking device, a nearby landmark to the tracking device, and the like. In one example, electronic tracking device 100 is portable and mobile and fits easily within a compact volume, such as standard pocket of an individual's shirt having approximate dimensions of 1.5 inch by 2.5 inch by 1.0 inch. In yet

another example, electronic tracking device 100 may be one integrated circuit having dimensionality in the mm range in all directions (or even smaller).

**[0028]** In one embodiment, location tracking circuitry 114, calculates location data received and sends the data to signal processing circuitry 104. Memory 112 stores operating software and data, for instance, communicated to and from signal processing circuit 104 and/or location tracking circuitry 114, e.g., GPS logic circuitry. In one embodiment, a signal detecting circuitry 115 detects and measures signal power level. In another embodiment, the signal processing circuitry 104 processes and measures signal power level. Battery level detection circuitry (e.g., battery level monitor 116) detects a battery level of battery 118, which contains one or more individual units or a plurality of units grouped as a single unit.

**[0029]** In one non-limiting example, antennas 122a, 122b electrically couple to transceiver 102. In one variant, transceiver 102 includes one integrated circuit or, in another embodiment, may be multiple individual circuits or integrated circuits. Transceiver 102 communicates a signal including location data between tracking device 100 and the monitoring station 110, for example, by any of the following including: wireless network, wireless data transfer station, wired telephone, and Internet channel. A demodulator circuit 126 extracts baseband signals, for instance at 100 KHz, including tracking device configuration and software updates, as well as converts a low-frequency AC signal to a DC voltage level. The DC voltage level, in one example, is supplied to battery charging circuitry 128 to recharge a battery level of the battery 118. In one embodiment, a user of monitoring station 110, e.g., a mobile personal digital assistant, mobile phone, or the like, by listening (or downloading) one or more advertisements to reduce and/or shift, usage charges to another user, account, or database (as

described in more detail in previous incorporated by reference U.S. patent applications Ser. Nos. 11/784,400 and 11/784,318 each filed on Apr. 5, 2007).

**[0030]** In another embodiment, an accelerometer 130, for example, a dual-axis accelerometer 130, e.g. ADXL320 integrated circuit manufactured by Analog Devices having two substantially orthogonal beams, may be utilized. The data sheet ADXH320L from Analog Devices is incorporated by reference. In one embodiment, the accelerometer 130 activates upon one or more designated antenna(s), e.g., antennas 122a, 122b, detecting a first signal level, e.g., a low signal level or threshold value, as specified by, for instance, a user or system administrator. In one variant of this embodiment, electrical circuitry associated with GPS signal acquisition, e.g., all or a portion of amplifier block 120, may be, for instance, placed on standby or in a sleep mode. In another embodiment, the accelerometer 130 remains in a standby mode until, for instance, a system administrator, a specified time period, or a user activates the accelerometer 130. In one embodiment, the amplifier block 120 includes multiple electronic functions and blocks including a low noise amplifier, a power amplifier, a RF power switch, or the like, placed in a sleep or standby mode, for instance, to conserve a battery level of the battery 118.

**[0031]** In another variant of this embodiment, circuitry, such as amplifier block 120 or location tracking circuitry 114, may be placed in a sleep or standby mode to conserve a battery level of the battery 118. In one variant, the tracking device 100 periodically checks availability of GPS signal, e.g., performs a GPS signal acquisition to determine if a receive communication signal is above a first signal level. Referring to embodiment depicted in FIG. 2, electronic tracking device 100 exits an opening 150 in partially enclosed structure 210; thus, electronic tracking device 100 may resume GPS signal acquisition using GPS satellite 143 (e.g., in response

to a periodic check by the tracking device 100 of a receive communication signal level above a first signal level).

**[0032]** In one embodiment, system administrator selects a signal noise bandwidth, e.g., within a range of 3 to 500 Hz, of the accelerator 130 to measure dynamic acceleration (e.g., due to vibration forces applied, to electronic tracking device 100). In another embodiment, system administrator selects a signal noise bandwidth, e.g., within a range of 3 to 500 Hz, to measure static acceleration (due to gravitational forces applied to electronic tracking device 100). In particular, external forces on electronic tracking device 100 cause, for example, internal structural movements, e.g., deflection of dual-axis beams, of the accelerometer 130. The deflection of dual-axis beams generates differential voltage(s).

**[0033]** Differential voltage(s) are proportional to acceleration measurements, e.g., discrete acceleration measurements, of electronic tracking device 100, for instance in x, y, and z directions. Differential voltage(s), in one instance, are relative to, for instance, last known GPS location coordinates of electronic tracking device 100. By performing electronic device proximity measurements, e.g., measuring acceleration vectors of electronic tracking device 100 at time intervals, e.g., T1, T2, T3 . . . TN, monitoring station 110 computes electronic tracking device velocity at time intervals, e.g., T1, T2, T3 . . . TN. In one embodiment, time intervals, e.g., T1, T2, and T3 . . . TN are measured in accordance with instructions by a system administrator or user. In one embodiment, time intervals are selected within a range of one micro-second to several minutes.

**[0034]** In one embodiment, the monitoring station 110 performs an integration of the acceleration measurements as a function of time to compute electronic tracking device velocity

at time intervals, e.g., T1, T2, and T3 . . . TN. By referencing prior location coordinates, e.g., last known accurate location data of the electronic tracking device 100 or last known location data of nearby electronic tracking device (e.g., second tracking device 101 in proximity to electronic tracking device 100), monitoring station 110 computes a current location of electronic tracking device 100 utilizing electronic tracking device velocity computations. Advantageously, monitoring station 110, in an above described embodiment, uses above described device proximity measurements to monitor current location data of electronic tracking device 100 without connectivity to receive communication signals from GPS satellites.

**[0035]** In one embodiment, the monitoring station 110 may include a mobile phone having connectivity to wireless network 140 electrically coupled to electronic tracking device 100 (FIG. 2). In this variant, the wireless network 140 resides or circulates within at least a portion of a semi-enclosed, partially-enclosed, or fully enclosed structure, e.g., building, parking structure, closet, storage room, or the like (e.g., structure 210 in FIG. 2). Furthermore, in one embodiment, the present invention conserves battery power by placing on standby, low power mode, or disabling entirely GPS signal, acquisition, circuitry and other associated devices, e.g., all or a portion of amplifier block 120 including power amplifiers, LNAs, switches, and the like. Furthermore, during supplemental location coordinates tracking, e.g., electronic device proximity measurements, the transceiver circuitry (e.g., transceiver 102, location tracking circuitry 114, and signal, processing circuitry 104) consumes reduced battery power for GPS circuitry while the electronic tracking device 100 communicates displacement vectors (e.g., differential location coordinates) to monitoring station 110 (e.g., a mobile phone, a personal digital assistant) through a wireless network 140. As described above, when GPS signaling is

not practicable, electronic device proximity measurements provide differential location coordinate information to calculate current location coordinate information.

**[0036]** In one embodiment, accelerometer, e.g., accelerometer 130, determines if electronic tracking device 100 in a stationary position for a period, for instance, designated by system administrator or user. For example, electronic tracking device 100 may be, for example, located on a counter top, within, a pocket of clothing, or in suitcase, not being moved, or not currently in use. Continuing with this embodiment, electronic tracking device 100 communicates a code, e.g., a stationary acknowledgement code, to communication network, e.g., wireless network 140. In one variant, when or if monitoring station 110 requests location data through communication network, electronic tracking device 100 determines whether it is located in a stationary or substantially stationary position and electronic tracking device 100 communicates its last-known location to the monitoring station 110 without accessing or requiring GPS signaling or active GPS circuitry, e.g., location tracking circuitry 114. Advantageously, in this embodiment, when electronic tracking device 100 does not utilize and require GPS circuitry, e.g., location tracking circuitry 114, or functionality, the power resources are preserved of battery 118 in contrast to many conventional GPS communication systems, which continue powering-on GPS circuitry. In one embodiment, electronic tracking device 130 associated with a person or object remains at a substantially stationary position approximately one-fourth to one-third of a calendar day; thus, this feature of not accessing GPS circuitry preserves battery power.

**[0037]** In another embodiment, an accelerometer, such as accelerometer 130, detects tapping against electronic tracking device 100. For instance, upon wake-up, user prompt,

system, administrator prompt, or active, accelerometer 130 detects a person or object tapping a sequence on electronic tracking device 100. In one embodiment, electronic tracking device 100 includes digital signal programming circuitry (such as of signal, processing circuitry 104). The digital signal programming circuitry recognizes programmed motions received by accelerometer, such as accelerometer 130, and transmits an alert message to the monitoring station 110 upon receiving a recognized motion pattern. For example, electronic tracking device 100 may be programmed to recognize an "SOS tap cadence". Thus, it electronic tracking device 100 is repeatedly tapped, for instance, in a "dot-dot-dot, dash-dash-dash, dot-dot-dot" pattern, signal processing circuitry 104 recognizes a motion pattern and transmit an alert message to wireless network 114 to monitoring station 110. In one instance, alert message may be associated with a distress pattern and may require an appropriate response. In one variant, the accelerometer may recognize when an object or individual spins or turns motion of electronic tracking device 100. Continuing with this embodiment, signal processing circuitry 104 recognizes programmed motions, and transceiver 102 transmits an alert message to wireless network 114 associated with programmed motions. In another variant, electronic tracking device 100 is programmed to recognize other motion patterns, such as when it is tumbled or flipped. Depending upon duration, time, or cadence of these movements or motion patterns, electronic tracking device 100 communicates an alert message to the wireless network 114. In one variant, wireless network 114 performs an appropriate action, such as communicating information signal to monitoring station 110.

**[0038]** In another example, physical impacts on electronic tracking device 100 are measured to determine if an individual or object may be injured. In one embodiment,



magnitude of displacement vectors may be measured by one or more accelerometers, such as accelerometer 130, disposed at various inclinations and orientations, e.g., disposed substantially orthogonal to one another. Continuing with this embodiment, when a measured physical impact is above a predetermined level, an object or individual associated with electronic tracking device 100 may have suffered a fall or be in need of medical attention. In one variant of this embodiment, a user (e.g., a system administrator, or person located in a contact book) at monitoring station 110 becomes alerted, e.g., by text message, email, or voice mail (as more fully described in previously incorporated by reference U.S. patent application Ser. No. 11/935,901 filed on Nov. 6, 2007, entitled "System and Method for Creating and Managing a Personalized Web Interface for Monitoring Location Information on Individuals and Objects Using Tracking Devices"). In one variant of this embodiment, if a user does not affirmatively respond, another individual, guardian, medical personnel, or law enforcement officer is contacted by monitoring station 110 (as more fully described in Ser. No. 11/935,901). In yet another variant of this embodiment, monitoring station 110 continues to contact individuals until the alert message is affirmatively answered.

#### Battery Conservation

**[0039]** Referring to FIG. 3, a flow chart 300 illustrates battery conservation for electronic tracking device 100 as described in FIGS. 1, 2 in accordance with one embodiment of the present invention. In step 302, antenna 122a associated with electronic tracking device 100 acquires a snapshot of receive communication signal including location coordinates data. In step 304, processing unit 104 processes the snapshot of receive communication signal including

location coordinates data. In step 306, processing unit 104 determines a power level of receive communication signal.

**[0040]** In step 308, accelerometer 130 activates if a power level of the receive communication signal is insufficient for processing. In one variant of step 308, accelerometer 130 measures acceleration of electronic tracking device 100 at time intervals, e.g., T1, T2, T3 . . . TN.

**[0041]** In step 310, processing unit 104 computes current location coordinates using acceleration measurements. In step 312, all or a portion of amplifier block 120 and associated circuitry, e.g., location tracking circuitry, are activated at selected time intervals to determine if receive communication signal is of sufficient signal strength. In one variation of step 312, upon determining receive communication signal of sufficient signal strength, location tracking circuitry 114 are activated, and processing unit 104 determines location coordinates from the receive communication signal. In another variation of step 312, upon determining receive communication signal of sufficient signal strength, accelerometer 130 is deactivated and location tracking circuitry 114 are activated, and processing unit 104 determines location coordinates from the receive communication signal.

**[0042]** It is noted that many variations of the methods described above may be utilized consistent with the present invention. Specifically, certain steps are optional and may be performed or deleted as desired. Similarly, other steps (such as additional data sampling, processing, filtration, calibration, or mathematical analysis for example) may be added to the foregoing embodiments. Additionally, the order of performance of certain steps may be

permuted, or performed in parallel (or series) if desired. Hence, the foregoing embodiments are merely illustrative of the broader methods of the invention disclosed herein.

**[0043]** While the above detailed description has shown, described, and pointed out novel features of the invention as applied to various embodiments, it will be understood that various omissions, substitutions and changes in the form and details of the device or process illustrated may be made by those skilled in the art without departing from the spirit of the invention. The foregoing description is of the best mode presently contemplated of carrying out the invention. This description is in no way meant to be limiting, but rather should be taken as illustrative of the general principles of the invention. The scope of the invention should be determined with reference to the claims.

WHAT IS CLAIMED IS:

1. A portable electronic tracking device to monitor location coordinates of one or more individuals or objects, the device comprising:

transceiver circuitry to receive at least one portion of a receive communication signal comprising location coordinates information;

accelerometer circuitry to measure displacements of the portable electronic tracking device;

a battery power monitor configured to selectively activate and deactivate at least one portion of the transceiver circuitry and location tracking circuitry to conserve battery power in response to a signal level of the at least one portion of the receive communication signal; and

processor circuitry configured to process the at least one portion of the receive communication signal.

2. The device of claim 1, wherein the at least one portion of the receive communication signal comprises a snapshot of the receive communication signal.

3. The device of claim 1, wherein the processor circuitry is further configured to compute the location coordinates of the portable electronic tracking device from the at least one portion of the receive communication signal and the displacements of the portable electronic tracking device in response to the signal level of the at least one portion of the receive communication signal.

4. The device of claim 1, wherein the accelerometer comprises a multi-beam structure having at least one beam of the multi-beam structure comprising a directional orientation substantially orthogonal to at least one other beam of the multi-beam structure.
5. The device of claim 4, wherein the directional orientation substantially orthogonal to at least one other beam of the multi-beam structure comprises a multi-directional orientation to measure differential displacement accelerations in x, y, and z orientation directions utilized to compute differential location coordinates information in response to the portable electronic tracking device detection of a signal level less than a first signal level.
6. The device of claim 4, wherein the directional orientation substantially orthogonal to at least one beam of the multi-beam structure comprises a multi-directional orientation to measure differential displacement accelerations in x, y, and z orientation directions to compute differential location coordinates information in response to the portable electronic tracking device detection of a signal level less than a first signal level.

7. The device of claim 1, wherein the displacements are transmitted to a monitoring station to determine current location coordinate information of the portable electronic tracking device based in part on the displacements and at least one of last known location coordinates of the portable electronic tracking device, last known location coordinates of another electronic tracking device, and landmark location coordinates.
8. The device of claim 1, wherein the location tracking circuitry is configured to calculate location data based on the at least one portion of the receive communication signal.
9. The device of claim 8, wherein the battery power monitor is configured to deactivate the location tracking circuitry when a communication signal is below a predefined level.
10. The device of claim 8, wherein the battery power monitor is configured to activate the location tracking circuitry when the at least one portion of the receive communication signal is above a predefined level.
11. The device of claim 8, wherein the battery power monitor is configured to deactivate the accelerometer circuitry when the at least one portion of the receive communication signal is above the predefined level.

12. The device of claim 8, wherein the battery power monitor is configured to activate the accelerometer circuitry when the at least one portion of the receive communication signal is below the predefined level.
13. The device of claim 7, wherein the battery power monitor is configured to deactivate the location tracking circuitry while the displacements are transmitted to the monitoring station.
14. The device of claim 1, wherein the transceiver is configured to receive the at least one portion of the receive communication signal from a GPS satellite and from a wireless communication network.
15. A method to monitor location coordinates of one or more individuals or objects, the method comprising:
- receiving at transceiver circuitry of a portable electronic tracking device at least one portion of a receive communication signal comprising location coordinates information;
  - measuring displacements of the portable electronic tracking device;
  - activating and deactivating at least one portion of the transceiver circuitry and location tracking circuitry to conserve battery power in response to a signal level of the at least one portion of the receive communication signal; and

processing the at least one portion of the receive communication signal using processor circuitry.

16. The method of claim 15, wherein the processing further comprises computing the location coordinates of the portable electronic tracking device from the at least one portion of the receive communication signal and the displacements of the portable electronic tracking device in response to the signal level of the at least one portion of the receive communication signal.

17. The method of claim 15, further comprising transmitting the displacements to a monitoring station to determine current location coordinates information of the portable electronic tracking device based in part on the displacements and at least one of last known location coordinates of the portable electronic tracking device, last known location coordinates of another electronic tracking device, and landmark location coordinates.

18. The method of claim 15, further comprising calculating location data based on the at least one portion of the receive communication signal using the location tracking circuitry.

19. The method of claim 15, wherein the location tracking circuitry is deactivated when a communication signal is below a predefined level.



20. The method of claim 15, wherein the location tracking circuitry is activated when the at least one portion of the receive communication signal is above a predefined level.
21. The method of claim 15, wherein the accelerometer is deactivated when the at least one portion of the receive communication signal is above the predefined level.
22. The method of claim 15, wherein the accelerometer is activated when the at least one portion of the receive communication signal is below the predefined level.
23. The method of claim 17, wherein the location tracking circuitry is deactivated while the displacements are transmitted to the monitoring station.
24. The method of claim 15, wherein the at least one portion of the receive communication signal is received from a GPS satellite or from a wireless communication network.

## ABSTRACT

A device and method to monitor location coordinates of an electronic tracking device are disclosed here. The device includes transceiver circuitry to receive at least one portion of a receive communication signal comprising location coordinates information; accelerometer circuitry to measure displacements of the portable electronic tracking device; a battery power monitor configured to selectively activate and deactivate at least one portion of the transceiver circuitry and location tracking circuitry; and processor circuitry configured to process the at least one portion of the receive communication signal. The method includes receiving at transceiver circuitry of a portable electronic tracking device at least one portion of a receive communication signal comprising location coordinates information; measuring displacements of the portable electronic tracking device; activating and deactivating at least one portion of the transceiver circuitry and location tracking circuitry; and processing the at least one portion of the receive communication signal using processor circuitry.

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<b>Application Data Sheet 37 CFR 1.76</b>		<b>Attorney Docket Number</b>	LB1-006USD1
		<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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**Applicant Information**

<b>Applicant 1</b>				
<b>Applicant Authority</b>	<input checked="" type="checkbox"/> Inventor	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Party of Interest under 35 U.S.C. 118	
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>
	Joseph	F.	Scalisi	
<b>Residence Information (Select One)</b>	<input checked="" type="checkbox"/> US Residency	<input type="checkbox"/> Non US Residency	<input type="checkbox"/> Active US military Service	
<b>City</b>	Yorba Linda	<b>State</b>	CA	<b>Country of Residence</b>
				US
<b>Citizenship under 37 CFR 1.41(b)</b>	US			

**Mailing Address of Applicant:**

<b>Address 1</b>	21520 Yorba Linda Blvd G357		
<b>Address 2</b>			
<b>City</b>	Yorba Linda	<b>State/Province</b>	CA
<b>Postal Code</b>	92887	<b>Country</b>	United States of America

**Applicant Information**

<b>Applicant 2</b>			
<b>Applicant Authority</b>	<input checked="" type="checkbox"/> Inventor	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Party of Interest under 35 U.S.C. 118

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	LB1-006USD1
	<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

		U.S.C. 117		118	
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	David		Butler		
<b>Residence Information (Select One)</b>		<input type="checkbox"/> US Residency	<input checked="" type="checkbox"/> Non US Residency	<input type="checkbox"/> Active US military Service	
<b>City</b>	Staffordshire	<b>State</b>		<b>Country of Residence</b>	GB
<b>Citizenship under 37 CFR 1.41(b)</b>	GB				

**Mailing Address of Applicant:**

<b>Address 1</b>	9A East Butts Road				
<b>Address 2</b>	Rugeley				
<b>City</b>	Staffordshire	<b>State/Province</b>			
<b>Postal Code</b>	WS152LU	<b>Country</b>		United Kingdom	

**Applicant Information**

<b>Applicant 3</b>					
<b>Applicant Authority</b>	<input checked="" type="checkbox"/> Inventor	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Party of Interest under 35 U.S.C. 118		
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Roger	B.	Anderson		
<b>Residence Information (Select One)</b>		<input checked="" type="checkbox"/> US Residency	<input type="checkbox"/> Non US Residency	<input type="checkbox"/> Active US military Service	
<b>City</b>	Arcadia	<b>State</b>	CA	<b>Country of Residence</b>	US
<b>Citizenship under 37 CFR 1.41(b)</b>	US				

**Mailing Address of Applicant:**

<b>Address 1</b>	713 W. Duarte Rd., #G-170
------------------	---------------------------

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<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	LB1-006USD1
	<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

<b>Address 2</b>			
<b>City</b>	Arcadia	<b>State/Province</b>	CA
<b>Postal Code</b>	91007	<b>Country</b>	United States of America

## Applicant Information

<b>Applicant 4</b>					
<b>Applicant Authority</b>	<input checked="" type="checkbox"/> Inventor	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Party of Interest under 35 U.S.C. 118		
<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Desiree		Mejia		
<b>Residence Information (Select One)</b>	<input checked="" type="checkbox"/> US Residency	<input type="checkbox"/> Non US Residency	<input type="checkbox"/> Active US military Service		
<b>City</b>	Redondo Beach	<b>State</b>	CA	<b>Country of Residence</b>	US
<b>Citizenship under 37 CFR 1.41(b)</b>	US				

### Mailing Address of Applicant:

<b>Address 1</b>	1874 S. Pacific Coast Hwy #906		
<b>Address 2</b>			
<b>City</b>	Redondo Beach	<b>State/Province</b>	CA
<b>Postal Code</b>	90277	<b>Country</b>	United States of America

## Applicant Information

<b>Applicant 5</b>			
<b>Applicant Authority</b>	<input checked="" type="checkbox"/> Inventor	<input type="checkbox"/> Legal Representative under 35 U.S.C. 117	<input type="checkbox"/> Party of Interest under 35 U.S.C. 118

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<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	LB1-006USD1
	<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

<b>Prefix</b>	<b>Given Name</b>	<b>Middle Name</b>	<b>Family Name</b>	<b>Suffix</b>	
	Michael	L.	Beydler		
<b>Residence Information (Select One)</b>		<input checked="" type="checkbox"/> US Residency	<input type="checkbox"/> Non US Residency	<input type="checkbox"/> Active US military Service	
<b>City</b>	Irvine	<b>State</b>	CA	<b>Country of Residence</b>	US
<b>Citizenship under 37 CFR 1.41(b)</b>		US			

**Mailing Address of Applicant:**

<b>Address 1</b>	2575 McCabe Way #230		
<b>Address 2</b>			
<b>City</b>	Irvine	<b>State/Province</b>	CA
<b>Postal Code</b>	92614	<b>Country</b>	United States of America

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below.  
For further information see 37 CFR 1.33(a).

A Customer Number is being provided for the correspondence information of this application

**Customer Number** 93892

**Application Information:**

<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE		
<b>Attorney Docket Number</b>	LB1-006USD1	<input checked="" type="checkbox"/>	<b>Small Entity Status Claimed</b>
<b>Application Type</b>	Non provisional		
<b>Subject Matter</b>	Utility		
<b>Suggested Class (if any)</b>		<b>Sub Class (if any)</b>	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	LB1-006USD1
	<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

<b>Suggested Technology Center (if any)</b>			
<b>Total Number of Drawing Sheets (if any)</b>	3	<b>Selected Figure for Publication (if any)</b>	1

**Publication Information:**

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing			
<b>Please Select One:</b>	<input checked="" type="checkbox"/> Customer Number	<input type="checkbox"/> US Patent Practitioner	<input type="checkbox"/> Limited Recognition (37 CFR 11.9)
<b>Customer Number</b>	93892		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a) (2) or CFR 1.78(a) (4), and need not otherwise be made part of the specification.			
<b>Prior Application Status</b>			
<b>Application Number</b>	<b>Continuity Type</b>	<b>Prior Application Number</b>	<b>Filing Date</b>
This Application	Divisional of	11/969,905	January 6, 2008

**Foreign Priority Information:**

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).
---

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

<b>Application Data Sheet 37 CFR 1.76</b>	<b>Attorney Docket Number</b>	LB1-006USD1
	<b>Application Number</b>	
<b>Title of Invention</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

<b>Application Number</b>	<b>Country</b>	<b>Parent Filing Date</b>	<b>Priority Claimed</b>	
			<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Assignee Information:**

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.				
If the Assignee is an Organization check here. <input checked="" type="checkbox"/>				
<b>Organization Name</b>	Location Based Technologies Inc.			
<b>Mailing Address Information:</b>				
<b>Address 1</b>	49 Discovery Suite 260			
<b>Address 2</b>				
<b>City</b>	Irvine	<b>State/Province</b>	CA	
<b>Country</b>	United States of America	<b>Postal Code</b>	92618	
<b>Phone Number</b>	888-600-1044	<b>Fax Number</b>	714-200-0287	
<b>Email Address</b>	joseph@pocketfinder.com			

**Signature:**

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
<b>Signature</b>	/Christopher Lattin/		<b>Date</b>	2012-01-23	
<b>First Name</b>	Christopher	<b>Last Name</b>	Lattin	<b>Registration Number</b>	56064

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	LB1-006USD1
	Application Number	
Title of Invention	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE	

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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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/356,599, 01/23/2012, 3662, 650, LB1-006USD1, 24, 2

CONFIRMATION NO. 1007

FILING RECEIPT



93892
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Date Mailed: 02/07/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. 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)

Joseph F. Scalisi, Yorba Linda, CA;
David Butler, Staffordshire, UNITED KINGDOM;
Roger B. Anderson, Arcadia, CA;
Desiree Mejia, Redondo Beach, CA;
Michael L. Beydler, Irvine, CA;

Assignment For Published Patent Application

Location Based Technologies Inc., Irvine, CA

Power of Attorney: The patent practitioners associated with Customer Number 93892

Domestic Priority data as claimed by applicant

This application is a DIV of 11/969,905 01/06/2008 PAT 8102256

Foreign Applications (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 02/02/2012

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/356,599

Projected Publication Date: 05/17/2012

Non-Publication Request: No

Early Publication Request: No

\*\* SMALL ENTITY \*\*

**Title**

APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES  
OF A TRACKING DEVICE

**Preliminary Class**

342

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

**LICENSE FOR FOREIGN FILING UNDER****Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

#### **NOT GRANTED**

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

---

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**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number  
13/356,599

**APPLICATION AS FILED - PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	24 minus 20 = *	4
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 = *	
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.

**SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	95
N/A	310
N/A	125
x 30 =	120
x 125 =	0.00
	0.00
TOTAL	650

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
TOTAL	

**APPLICATION AS AMENDED - PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
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 found in the appropriate box in column 1.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/356,599	01/23/2012	Joseph F. Scalisi	LB1-006USD1

**CONFIRMATION NO. 1007**

**POA ACCEPTANCE LETTER**



93892  
Timberline Patent Law Group  
108 N. Washington St.  
Suite 417  
Spokane, WA 99201

Date Mailed: 02/07/2012

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 01/23/2012.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/ewondimu/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PLUS Search Results for S/N 13356599, Searched Mon Mar 19 11:21:44 EDT 2012

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5486831 99	5458493 99
6104295 99	
6191734 99	
6198696 99	
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5410519 99	
5433612 99	
5433615 99	
5434617 99	
5437554 99	
5448110 99	
5455619 99	



NOTICE OF ALLOWANCE AND FEE(S) DUE

93892 7590 03/26/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Table with 2 columns: EXAMINER (NGUYEN, PHUNG), ART UNIT (2612), PAPER NUMBER

DATE MAILED: 03/26/2012

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.



PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

93892 7590 03/26/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Form with fields for Depositor's name, Signature, and Date.

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE.

Table with 3 columns: EXAMINER, ART UNIT, CLASS-SUBCLASS.

Form with 2 main sections for change of correspondence address and printing on patent front page.

Section 3: ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type). Includes fields for name and residence.

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

Sections 4a and 4b: Fee submission and payment options.

Section 5: Change in Entity Status (from status indicated above).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Date
Typed or printed name Registration No.

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/356,599 01/23/2012 Joseph F. Scalisi LB1-006USD1 1007

93892 7590 03/26/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

EXAMINER

NGUYEN, PHUNG

ART UNIT PAPER NUMBER

2612

DATE MAILED: 03/26/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## Privacy Act Statement

**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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

**Notice of Allowability**

**Application No.**

13/356,599

**Examiner**

PHUNG NGUYEN

**Applicant(s)**

SCALISI ET AL.

**Art Unit**

2612

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- 1.  This communication is responsive to 01/23/12.
- 2.  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.
- 3.  The allowed claim(s) is/are 1-24.
- 4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - 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)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- 5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  - 6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
    - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
- 7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- 1.  Notice of References Cited (PTO-892)
- 2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3.  Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
- 4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 5.  Notice of Informal Patent Application
- 6.  Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_ .
- 7.  Examiner's Amendment/Comment
- 8.  Examiner's Statement of Reasons for Allowance
- 9.  Other \_\_\_\_\_.

**DETAILED ACTION**

*Allowable Subject Matter*

1. Claims 1-24 are allowed.
2. The following is an examiner's statement of reasons for allowance:

The instant application is directed to a portable electronic tracking device to monitor location coordinate of one or more objects. Each independent claim identifies the uniquely distinct combination of features including "a battery power monitor configured to selectively activate and deactivate at least one portion of the transceiver circuitry and location tracking circuitry to conserve battery power in response to a signal level of the at least one portion of the receive communication signal". This patentable distinction is included in all independent claims 1, and 15. The closest prior art, Croyle et al. (US 5,862,511) and Lau et al. (US 5,592,173). Croyle et al. disclose vehicle navigation system and method, and Lau et al. disclose GPS receiver having a low power standby mode. The references, either singularly or in combination, fail to anticipate or render the above limitations obvious.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion.*

Art Unit: 2612

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phung Nguyen whose telephone number is 571-272-2968. The examiner can normally be reached on Monday to Friday from 8:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel J. Wu, can be reached on 571-272-2964. The fax phone number for this Group is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is 571-272-2600.

/PHUNG NGUYEN/

Primary Examiner, Art Unit 2612

Date: March 17, 2012

<b>Notice of References Cited</b>	Application/Control No. 13/356,599	Applicant(s)/Patent Under Reexamination SCALISI ET AL.	
	Examiner PHUNG NGUYEN	Art Unit 2612	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-5,862,511	01-1999	Croyle et al.	701/445
*	B US-5,592,173	01-1997	Lau et al.	342/357.74
*	C US-7,612,663	11-2009	Sun, Chun-I	340/539.3
*	D US-6,774,838	08-2004	Sun, Chun-I	342/357.57
*	E US-2005/0113124	05-2005	Syrjarinne et al.	455/522
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*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.



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BIB DATA SHEET

CONFIRMATION NO. 1007

<b>SERIAL NUMBER</b> 13/356,599	<b>FILING or 371(c) DATE</b> 01/23/2012 <b>RULE</b>	<b>CLASS</b> 340	<b>GROUP ART UNIT</b> 2612	<b>ATTORNEY DOCKET NO.</b> LB1-006USD1	
<b>APPLICANTS</b> Joseph F. Scalisi, Yorba Linda, CA; David Butler, Staffordshire, UNITED KINGDOM; Roger B. Anderson, Arcadia, CA; Desiree Mejia, Redondo Beach, CA; Michael L. Beydler, Irvine, CA;					
<b>** CONTINUING DATA *****</b> <span style="float: right;">PTN</span> This application is a DIV of 11/969,905 01/06/2008 PAT 8,102,256					
<b>** FOREIGN APPLICATIONS *****</b> <span style="float: right;">PTN</span>					
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b> 02/02/2012					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/PHUNG NGUYEN/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> CA	<b>SHEETS DRAWINGS</b> 3	<b>TOTAL CLAIMS</b> 24	<b>INDEPENDENT CLAIMS</b> 2
<b>ADDRESS</b> Timberline Patent Law Group 108 N. Washington St. Suite 417 Spokane, WA 99201 UNITED STATES					
<b>TITLE</b> APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE					
<b>FILING FEE RECEIVED</b> 650	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		



<b>Search Notes</b>  	<b>Application/Control No.</b>  13356599	<b>Applicant(s)/Patent Under Reexamination</b>  SCALISI ET AL.
	<b>Examiner</b>  PHUNG NGUYEN	<b>Art Unit</b>  2612

SEARCHED			
Class	Subclass	Date	Examiner
340	539.13,539.21,686.1,636.1	03/17/12	PTN
701	400	03/17/12	PTN

SEARCH NOTES		
Search Notes	Date	Examiner

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
701	400	03/17/12	PTN

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## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	126	"5486831" "6104295" "6191734" "6198696" "3907223" "3805227" "4124865" "4248217" "4295277" "4332238" "4363935" "4364272" "4373185" "4394089" "4432458" "4527198" "4539590" "4574289" "4593406" "4757984" "4792904" "4836672" "4875153" "4922174" "4940245" "4950881" "4993830" "5026009" "5181036" "5193727" "5206697" "5227803" "5266925" "5287177" "5303146" "5313051" "5317309" "5317321" "5321611" "5343391" "5344057" "5404247" "5410519" "5433612" "5433615" "5434617" "5437554" "5448110" "5455619" "5458493" ).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/19 12:55
S1	2	"20090174603"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 16:28
S2	4	((("7181192") or ("7292223")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 16:43
S3	142	((("20010030667") or ("20010048364") or ("20030041328") or ("20020067256") or ("20020077130") or ("20020180602") or ("20020186135") or ("20020196123") or ("20030043200") or ("20030131073") or ("20030208518") or ("20030210262") or ("20030212729") or ("20040010689") or ("20040165726") or ("20040166879") or ("20040172403") or ("20040212493") or ("20050012620") or ("20050071736") or ("20050099303") or ("20050159883") or ("20050181870") or ("20050188403") or ("20050210260") or ("20050246647") or ("20050248459") or ("20060009152") or ("20060205416") or ("20060206246") or ("20060211405") or ("20060232429") or ("20060253590") or ("20060290497") or ("20070028088") or ("20070033531") or ("20070053513") or ("20070054530") or ("20070061303") or ("20070073719") or ("20070083819") or ("20070159322") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 17:02

IPR2020-01192

Apple EX1002 Page 66

		( "20070229350" ) or ( "20070255620" ) or ( "20070288427" ) or ( "20080010585" ) or ( "20080028063" ) or ( "20080059504" ) or ( "20080059889" ) or ( "20080088437" ) or ( "20080090550" ) or ( "20080109762" ) or ( "20080129491" ) or ( "20080171559" ) or ( "20080172173" ) or ( "20080252254" ) or ( "20080252459" ) or ( "20090098857" ) or ( "20090098903" ) or ( "20090103722" ) or ( "20090111393" ) or ( "20090117921" ) or ( "20090119119" ) or ( "20090189807" ) or ( "20090201127" ) or ( "20090315706" ) or ( "20090315767" ) or ( "3924102" ) or ( "4379334" ) or ( "4807453" ).FN.				
S4	333	(( "20010030667" ) or ( "20010048364" ) or ( "20030041328" ) or ( "20020067256" ) or ( "20020077130" ) or ( "20020180602" ) or ( "20020186135" ) or ( "20020196123" ) or ( "20030043200" ) or ( "20030131073" ) or ( "20030208518" ) or ( "20030210262" ) or ( "20030212729" ) or ( "20040010689" ) or ( "20040165726" ) or ( "20040166879" ) or ( "20040172403" ) or ( "20040212493" ) or ( "20050012620" ) or ( "20050071736" ) or ( "20050099303" ) or ( "20050159883" ) or ( "20050181870" ) or ( "20050188403" ) or ( "20050210260" ) or ( "20050246647" ) or ( "20050248459" ) or ( "20060009152" ) or ( "20060205416" ) or ( "20060206246" ) or ( "20060211405" ) or ( "20060232429" ) or ( "20060253590" ) or ( "20060290497" ) or ( "20070028088" ) or ( "20070033531" ) or ( "20070053513" ) or ( "20070054530" ) or ( "20070061303" ) or ( "20070073719" ) or ( "20070083819" ) or ( "20070159322" ) or ( "20070229350" ) or ( "20070255620" ) or ( "20070288427" ) or ( "20080010585" ) or ( "20080028063" ) or ( "20080059504" ) or ( "20080059889" ) or ( "20080088437" ) or ( "20080090550" ) or ( "20080109762" ) or ( "20080129491" ) or ( "20080171559" ) or ( "20080172173" ) or ( "20080252254" ) or ( "20080252459" ) or ( "20090098857" ) or ( "20090098903" ) or ( "20090103722" ) or ( "20090111393" ) or ( "20090117921" ) or ( "20090119119" ) or ( "20090189807" ) or ( "20090201127" ) or ( "20090315706" ) or ( "20090315767" ) or ( "3924102" ) or ( "4379334" ) or ( "4807453" ) or ( "4850007" ) or ( "4885920" ) or ( "5079541" ) or ( "5127042" ) or ( "5353331" ) or ( "5361612" ) or ( "5386468" ) or ( "5417092" ) or ( "5432542" ) or ( "5490402" ) or ( "5541976" ) or ( "5563579" ) or ( "5565909" ) or ( "5768920" ) or ( "5785181" ) or ( "5876765" ) or ( "5967841" ) or ( "5973599" ) or ( "6088453" ) or ( "6141356" ) or ( "6236365" ) or ( "6330817" ) or ( "6388612" ) or ( "6441741" ) or ( "6445921" ) or ( "6563037" ) or ( "6498797" ) or ( "6546253" ) or ( "6611755" ) or ( "6633835" ) or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 18:13

		("6674368") or ("6708028") or ("6716101") or ("6731212") or ("6732090") or ("6735630") or ("6747561") or ("6754470") or ("6768942") or ("6778089") or ("6812824") or ("6833787") or ("6850252") or ("6859533") or ("6879244") or ("6885897") or ("6928280") or ("6937726") or ("6998985") or ("6998995") or ("7020701") or ("7038590") or ("7049957") or ("7064711") or ("7065244") or ("7065348") or ("7065370") or ("7079650") or ("7088242") or ("7088252") or ("7109868") or ("7120928")).PN. or (("7139396") or ("7146367") or ("7149189") or ("7155238") or ("7158912") or ("7200673") or ("7218242") or ("7246007") or ("7257836") or ("7272212") or ("7272662") or ("7284191") or ("7299277") or ("7302634") or ("7313825") or ("8501952") or ("7501984") or ("7571628") or ("7598855") or ("7626499") or ("7728724") or ("7823424")).PN.				
S5	2	"20010048364"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/16 08:45
S6	1	"9102256"	USPAT	OR	OFF	2012/03/07 16:10
S7	5	"9102256".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:11
S8	10	"8102256".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:11
S9	2	"7292223".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:14
S10	29	("20020003527"   "20020054011"   "20040095317"   "20040140962"   "4601206"   "4984463"   "5181181"   "5774113"   "5831553"   "5835077"   "5856802"   "5905460"   "5982169"	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/07 16:15




S20	0	(power near2 (sav\$3 or conserve or down)) with (gps near3 weak near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:15
S21	0	(power near3 (sav\$3 or conserve or down or off)) with (gps near3 weak near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:15
S22	0	(power near3 (monitor\$3 or sav\$3 or conserve or down or off)) with (gps near3 weak near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:16
S23	0	(battery near2 power near2 monitor\$3) with (gps near3 weak near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:26
S24	26	(battery near2 power near2 monitor\$3) and (gps near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:27
S25	2	"7292223".pn.	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:35
S26	2914	(340/539.13,539.21,686.1,636.1).ccls.	USPAT	OR	OFF	2012/03/16 16:55
S27	209	701/400.ccls.	USPAT	OR	OFF	2012/03/16 16:56
S28	7	S26 and ((power near2 sav\$3) with (gps) and accelerometer)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:56
S29	0	S27 and ((power near2 sav\$3) with (gps) and accelerometer)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2012/03/16 16:57

S30	253	(battery near2 monitor\$3) and (gps near2 signal)	IBM_TDB US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/17 10:01
S31	9	(battery near2 monitor\$3) and (gps near2 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/17 10:01

3/ 19/ 2012 1:04:00 PM

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<b>Issue Classification</b> 	<b>Application/Control No.</b> 13356599	<b>Applicant(s)/Patent Under Reexamination</b> SCALISI ET AL.
	<b>Examiner</b> PHUNG NGUYEN	<b>Art Unit</b> 2612

ORIGINAL				INTERNATIONAL CLASSIFICATION									
CLASS		SUBCLASS		CLAIMED				NON-CLAIMED					
340		539.13		G	0	8	B	1 / 08 (2006.01.01)					
<b>CROSS REFERENCE(S)</b>													
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)												

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant																<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original						
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NONE		<b>Total Claims Allowed:</b>	
		24	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/PHUNG NGUYEN/ Primary Examiner. Art Unit 2612	03/17/12	1	3
(Primary Examiner)	(Date)		





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Table with 4 columns: APPLICATION NUMBER (13/356,599), FILING OR 371(C) DATE (01/23/2012), FIRST NAMED APPLICANT (Joseph F. Scalisi), ATTY. DOCKET NO./TITLE (LB1-006USD1)

CONFIRMATION NO. 1007

PUBLICATION NOTICE



93892
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Title: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

Publication No. US-2012-0119905-A1

Publication Date: 05/17/2012

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Joseph F. Scalisi et al.	Examiner:	Unknown
Serial No.:	13/356,599	Group Art Unit:	Unknown
Filed:	January 23, 2012	Docket:	LB1-006USD1
Title:	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE		

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**INFORMATION DISCLOSURE STATEMENT**

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

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement.

Pursuant to 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicants' prior U.S. application, Serial No. 11969905, filed on January 06, 2008, which is relied upon for an earlier filing date under 35 U.S.C. §120.

Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Notification of this change to this effect was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004 and October 19, 2004. Thus, Applicant has not included copies of any US Patents or US Patent Applications identifiable by serial number that may be cited with this submission. Should the Office require copies to be provided, Applicant respectfully requests that notice of such

requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

Joseph F. Scalisi et al.

By their Representatives,

Date 5/25/2012

By /Christopher Lattin/  
Christopher Lattin  
Reg. No. 56064

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 50%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>		<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
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Sheet	1	of	8	Attorney Docket No: LB1-006USD1											

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Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
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		US-6812824	11/02/2004	Goldinger, James et al.	

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**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)  
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Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 50%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>		<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
<i>Complete if Known</i>															
<b>Application Number</b>	13/356,599														
<b>Filing Date</b>	January 23, 2012														
<b>First Named Inventor</b>	Scalisi, Joseph														
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<b>Examiner Name</b>	Unknown														
Sheet	5	of	8	<b>Attorney Docket No: LB1-006USD1</b>											

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**EXAMINER**

**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)  
\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. † Applicant's unique citation designation number (optional) ‡ Applicant is to place a check mark here if English language Translation is attached



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		<b>Application Number</b>	13/356,599
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	6	of	8
Attorney Docket No: LB1-006USD1			

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		<b>Art Unit</b>	Unknown		
		<b>Examiner Name</b>	Unknown		
Sheet	7	of	Attorney Docket No: LB1-006USD1		
			8		

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No <sup>1</sup>	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
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Sheet	8	of	8	Attorney Docket No: LB1-006USD1			

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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	12869947
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Christopher W. Lattin/Melissa Nelson
<b>Filer Authorized By:</b>	Christopher W. Lattin
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	25-MAY-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	15:49:48
<b>Application Type:</b>	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	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDSasFiled.pdf	221247 <small>35c9e626e9dcea605beddb4c37c94f826ae67ca5</small>	no	10

### Warnings:

### Information:

IPR2020-01192

**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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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes sub-tables for EXAMINER, ART UNIT, PAPER NUMBER, NOTIFICATION DATE, DELIVERY MODE.

7590 06/04/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

NOTICE OF NON-COMPLIANT INFORMATION DISCLOSURE STATEMENT

An Information Disclosure Statement (IDS) filed 5/25/12 in the above-identified application fails to meet the requirements of 37 CFR 1.97(d) for the reason(s) specified below. Accordingly, the IDS will be placed in the file, but the information referred to therein has not been considered.

The IDS is not compliant with 37 CFR 1.97(d) because:

- The IDS lacks a statement as specified in 37 CFR 1.97(e).
The IDS lacks the fee set forth in 37 CFR 1.17(p).
The IDS was filed after the issue fee was paid. Applicant may wish to consider filing a petition to withdraw the application from issue under 37 CFR 1.313(c) to have the IDS considered. See MPEP 1308.

Handwritten signature of application assistance unit

571-272-4200 or 1-888-786-0101
Application Assistance Unit
Office of Data Management

**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL  
(Submitted Only via EFS-Web)**

Application Number	13/356,599	Filing Date	2012-01-23	Docket Number (if applicable)	LB1-006USD1	Art Unit	2612
First Named Inventor	Joseph F. Scalisi			Examiner Name	Phung Nguyen		

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**  
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

**SUBMISSION REQUIRED UNDER 37 CFR 1.114**

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other \_\_\_\_\_

**MISCELLANEOUS**

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months \_\_\_\_\_  
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other \_\_\_\_\_

**FEES**

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No \_\_\_\_\_

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED**

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Christopher Lattin/	Date (YYYY-MM-DD)	2012-06-26
Name	Christopher Lattin	Registration Number	56064

This collection of information is required by 37 CFR 1.114. 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 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.

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



## Privacy Act Statement

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 records.
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.

**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL  
(Submitted Only via EFS-Web)**

Application Number	13/356,599	Filing Date	2012-01-23	Docket Number (if applicable)	LB1-006USD1	Art Unit	2612
First Named Inventor	Joseph F. Scalisi			Examiner Name	Phung Nguyen		

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**  
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

**SUBMISSION REQUIRED UNDER 37 CFR 1.114**

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other \_\_\_\_\_

**MISCELLANEOUS**

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months \_\_\_\_\_  
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other \_\_\_\_\_

**FEES**

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No \_\_\_\_\_

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED**

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Christopher Lattin/	Date (YYYY-MM-DD)	2012-06-26
Name	Christopher Lattin	Registration Number	56064

This collection of information is required by 37 CFR 1.114. 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 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.

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

## Privacy Act Statement

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 records.
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.
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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.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	12869947
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Christopher W. Lattin/Melissa Nelson
<b>Filer Authorized By:</b>	Christopher W. Lattin
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	25-MAY-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	15:49:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDSasFiled.pdf	221247 <small>35c9e626e9dcea605beddb4c37c94f826ae67ca5</small>	no	10

### Warnings:

### Information:

IPR2020-01192

**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.**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Joseph F. Scalisi et al.	Examiner:	Unknown
Serial No.:	13/356,599	Group Art Unit:	Unknown
Filed:	January 23, 2012	Docket:	LB1-006USD1
Title:	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE		

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**INFORMATION DISCLOSURE STATEMENT**

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

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement.

Pursuant to 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicants' prior U.S. application, Serial No. 11969905, filed on January 06, 2008, which is relied upon for an earlier filing date under 35 U.S.C. §120.

Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Notification of this change to this effect was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004 and October 19, 2004. Thus, Applicant has not included copies of any US Patents or US Patent Applications identifiable by serial number that may be cited with this submission. Should the Office require copies to be provided, Applicant respectfully requests that notice of such

requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

Joseph F. Scalisi et al.

By their Representatives,

Date 5/25/2012

By /Christopher Lattin/

Christopher Lattin

Reg. No. 56064



Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 60%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>	<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
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<b>Art Unit</b>	Unknown													
<b>Examiner Name</b>	Unknown													
Sheet	1	of	8	Attorney Docket No: LB1-006USD1										

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
		US-20010030667	10/18/2001	Kelts, Brett R.	
		US-20010048364	12/06/2001	Kalthoff, Robert M., et al.	
		US-20020041328	04/11/2002	LeCompte, Malcolm et al.	
		US-20020067256	06/06/2002	Kail IV, Karl A.	
		US-20020077130	06/20/2002	Owensby, Craig A.	
		US-20020180602	12/05/2002	Yoakum, Jay	
		US-20020186135	12/12/2002	Wagner, Colleen	
		US-20020196123	12/26/2002	Diehl, Joseph R., et al.	
		US-20030043200	03/06/2003	Faieta, Baldo et al.	
		US-20030131073	07/10/2003	Lucovsky, Mark H., et al.	
		US-20030177094	09/18/2003	Needham, Bradford H., et al.	
		US-20030208518	11/06/2003	Gura, Nils et al.	
		US-20030210262	11/13/2003	Gahm, Thomas et al.	
		US-20030212729	11/13/2003	Eberle, Hans et al.	
		US-20030235307	12/25/2003	Miyamoto, Kazuhiro	
		US-20040010689	01/15/2004	Vanstone, Scott A., et al.	
		US-20040021573	02/05/2004	Hoffman, Mark et al.	
		US-20040165726	08/26/2004	Yamamichi, Masato et al.	
		US-20040166879	08/26/2004	Meadows, Vernon et al.	
		US-20040172403	09/02/2004	Steele, Rhea L., et al.	
		US-20040212493	10/28/2004	Stilp, Louis A.	
		US-20050012620	01/20/2005	Yoakum, Jay	
		US-20050024201	02/03/2005	Culpepper, Jerry W., et al.	
		US-20050044356	02/24/2005	Srivastava, Sunil et al.	
		US-20050071282	03/31/2005	Lu, HongQian K., et al.	
		US-20050071736	03/31/2006	Schneider, Tina F., et al.	
		US-20050099303	05/12/2005	Suckerman, Andrew M.	
		US-20050113124	05/26/2005	Syrjarinne, Jari et al.	
		US-20050145688	07/07/2005	Milenkovic, Milan et al.	
		US-20050159883	07/21/2005	Humphries, Laymon S., et al.	
		US-20050181870	08/18/2005	Nguyen, Binh T., et al.	
		US-20050188403	08/25/2005	Kotzin, Michael D.	
		US-20050202830	09/15/2005	Sudit, Isaias	
		US-20050210260	09/22/2005	Venkatesan, Ramarathnam et al.	
		US-20050246647	11/03/2005	Beam, Tyler K., et al.	

**EXAMINER**

**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)  
 \* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 50%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>		<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
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Sheet	2	of	8	Attorney Docket No: LB1-006USD1											

US PATENT DOCUMENTS					
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		US-20050248459	11/10/2005	Bonalle, David S., et al.	
		US-20060009152	01/12/2006	Millard, Thomas A., et al.	
		US-20060084420	04/20/2006	Smith, Brian J., et al.	
		US-20060161377	07/20/2006	Rakkola, Juha et al.	
		US-20060205416	09/14/2006	Kayzar, Brett A., et al.	
		US-20060206246	09/14/2006	Walker, Richard C.	
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		US-20060253590	11/09/2006	Nagy, David et al.	
		US-20060290497	12/28/2006	Sugata, T.	
		US-20070028088	02/01/2007	Bayrak, Coskun et al.	
		US-20070033531	02/08/2007	Marsh, Christopher	
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		US-20070054530	03/08/2007	Bauer, Michael et al.	
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		US-20080059889	03/06/2008	Parker, Cheryl et al.	
		US-20080088437	04/17/2008	Aninye, Steve et al.	
		US-20080090550	04/17/2008	Scalisi, Joseph F., et al.	
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		US-20080171559	07/17/2008	Frank, Scott et al.	
		US-20080172173	07/17/2008	Chang, Eric et al.	

**EXAMINER**

**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)  
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US PATENT DOCUMENTS					
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		US-20080227473	09/18/2008	Haney, Richard D.	
		US-20080228654	09/18/2008	Edge, Stephen W.	
		US-20080252254	10/16/2008	Osada, Takeshi	
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		US-20090103722	04/23/2009	Anderson, Roger B., et al.	
		US-20090111393	04/30/2009	Scalisi, Joseph F., et al.	
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		US-5353331	10/04/1994	Emery, Mark J., et al.	
		US-5361612	11/08/1994	Voiculescu, Danut et al.	
		US-5386468	01/31/1995	Akiyama, Ryota et al.	
		US-5417092	05/23/1995	Iu, Chien-Chzh	
		US-5432542	07/11/1995	Thibadeau, Robert et al.	
		US-5490402	02/13/1996	Shieh, Jin-Ren	
		US-5541976	07/30/1996	Ghisler, Walter	
		US-5555286	09/10/1996	Tendler, Robert K.	
		US-5563579	10/08/1996	Carter, Ronald L.	

**EXAMINER**

**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)  
\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE                  STATEMENT BY APPLICANT</b>   (Use as many sheets as necessary)		<i>Complete if Known</i>	
		<b>Application Number</b>	13/356,599
		<b>Filing Date</b>	January 23, 2012
		<b>First Named Inventor</b>	Scalisi, Joseph
		<b>Art Unit</b>	Unknown
		<b>Examiner Name</b>	Unknown
	4	of	8
Attorney Docket No: LB1-006USD1			

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
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		US-5768920	06/23/1998	DeBevoise, Bruce D.	
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		US-6708028	03/16/2004	Byrne, John D.	
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<b>Examiner Name</b>	Unknown														
Sheet	5	of	8	Attorney Docket No: LB1-006USD1											

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
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		US-6833787	12/21/2004	Levi, Andrew E.	
		US-6850252	02/01/2005	Hoffberg, Steven M.	
		US-6859533	02/22/2005	Wang, Xin et al.	
		US-6879244	04/12/2005	Scalisi, Joseph F.	
		US-6882897	04/19/2005	Fernandez, Dennis S.	
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Sheet	6	of	8	Attorney Docket No: LB1-006USD1											

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Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	T <sup>2</sup>
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		WO-2007107022	09/27/2007	Krisl, Michal	

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<b>Examiner Name</b>	Unknown														
Sheet	7	of	8	Attorney Docket No: LB1-006USD1											

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No <sup>1</sup>	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
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		LI, XIAOJING et al., "The Complementary Characteristics of GPS and Accelerometer in Monitoring Structural Deformation", <u>ION 2005 Meeting</u> , (2005), 9 pages	
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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13356599
<b>Filing Date:</b>	23-Jan-2012
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Filer:</b>	Christopher W. Lattin/Melissa Nelson
<b>Attorney Docket Number:</b>	LB1-006USD1

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Request for continued examination	2801	1	465	465
<b>Total in USD (\$)</b>				<b>465</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	13113264
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Christopher W. Lattin/Melissa Nelson
<b>Filer Authorized By:</b>	Christopher W. Lattin
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	26-JUN-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	20:51:47
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$465
RAM confirmation Number	10952
Deposit Account	
Authorized User	

### File Listing:

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

1	Request for Continued Examination (RCE)	LB1006USD1RCE.pdf	697265 250128a3c291597f57f1fb2d4421a631ead474dc	no	3
<b>Warnings:</b>					
<b>Information:</b>					
2	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDSasFiled.pdf	263499 0ca56a419d31e9c446015845d1354eb5ee3fd9cb	no	12
<b>Warnings:</b>					
<b>Information:</b>					
This is not an USPTO supplied IDS fillable form					
The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.					
3	Fee Worksheet (SB06)	fee-info.pdf	30658 be82ff8d3c9af664bb99b8b0e827f023fbb86831	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				991422	
<p><b>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.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>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.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>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.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>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.</b></p>					

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.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/356,599</b>	Filing Date <b>01/23/2012</b>	<input type="checkbox"/> To be Mailed
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APPLICATION AS FILED – PART I			OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	SMALL ENTITY <input checked="" type="checkbox"/>	OR		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (j), or (m))</small>	N/A	N/A	N/A		N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A		N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(j))</small>	minus 20 =	*	X \$ =	OR	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =		X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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).					
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>						
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL	

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY			
	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT	<b>07/21/2012</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	* 24	Minus ** 24	= 0	X \$30 =	0	OR	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	* 2	Minus *** 3	= 0	X \$125 =	0	OR	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR	
					TOTAL ADD'L FEE	<b>0</b>	OR	TOTAL ADD'L FEE

	(Column 1)	(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)
	Total <small>(37 CFR 1.16(i))</small>	*	Minus **	=	X \$ =		OR	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus ***	=	X \$ =		OR	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>						OR	
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						OR	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.					Legal Instrument Examiner: /JOY J. DOBBS/			
** 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.								

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.



NOTICE OF ALLOWANCE AND FEE(S) DUE

93892 7590 07/30/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

EXAMINER
NGUYEN, PHUNG
ART UNIT PAPER NUMBER

2612
DATE MAILED: 07/30/2012

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/356,599 01/23/2012 Joseph F. Scalisi LBI-006USD1 1007
TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.
If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:
A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:
A. Pay TOTAL FEE(S) DUE shown above, or
B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

93892 7590 07/30/2012  
**Timberline Patent Law Group**  
 108 N. Washington St.  
 Suite 417  
 Spokane, WA 99201

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

13/356,599      01/23/2012      Joseph F. Scalisi      LB1-006USD1      1007

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional      YES      \$870      \$300      \$0      \$1170      10/30/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
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NGUYEN, PHUNG      2612      340-539130

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). <input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. <input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b>	2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____ (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____
--	--

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE      (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) :     Individual     Corporation or other private group entity     Government

4a. The following fee(s) are submitted: <input type="checkbox"/> Issue Fee <input type="checkbox"/> Publication Fee (No small entity discount permitted) <input type="checkbox"/> Advance Order - # of Copies _____	4b. Payment of Fee(s); ( <b>Please first reapply any previously paid issue fee shown above</b> ) <input type="checkbox"/> A check is enclosed. <input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached. <input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).
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**5. Change in Entity Status (from status indicated above)**

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.     b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/356,599 01/23/2012 Joseph F. Scalisi LB1-006USD1 1007

93892 7590 07/30/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Table with 2 columns: EXAMINER, ART UNIT, PAPER NUMBER
EXAMINER: NGUYEN, PHUNG
ART UNIT: 2612
PAPER NUMBER: (blank)

DATE MAILED: 07/30/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.



## Privacy Act Statement

**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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

**Notice of Allowability**

**Application No.**

13/356,599

**Examiner**

PHUNG NGUYEN

**Applicant(s)**

SCALISI ET AL.

**Art Unit**

2612

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- 1.  This communication is responsive to 06/26/12.
- 2.  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.
- 3.  The allowed claim(s) is/are 1-24.
- 4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - 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)).

\* Certified copies not received: \_\_\_\_.

Applicant has **THREE MONTHS FROM THE "MAILING DATE"** of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in **ABANDONMENT** of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- 5.  A **SUBSTITUTE OATH OR DECLARATION** must be submitted. Note the attached **EXAMINER'S AMENDMENT** or **NOTICE OF INFORMAL PATENT APPLICATION (PTO-152)** which gives reason(s) why the oath or declaration is deficient.
  - 6.  **CORRECTED DRAWINGS** ( as "replacement sheets") must be submitted.
    - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_.
    - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
- 7.  **DEPOSIT OF and/or INFORMATION** about the deposit of **BIOLOGICAL MATERIAL** must be submitted. Note the attached Examiner's comment regarding **REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL**.

**Attachment(s)**

- 1.  Notice of References Cited (PTO-892)
- 2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3.  Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_
- 4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 5.  Notice of Informal Patent Application
- 6.  Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_ .
- 7.  Examiner's Amendment/Comment
- 8.  Examiner's Statement of Reasons for Allowance
- 9.  Other \_\_\_\_.

## **DETAILED ACTION**

### *Allowable Subject Matter*

1. Claims 1-24 are allowed.
2. The following is an examiner's statement of reasons for allowance:

The instant application is directed to a portable electronic tracking device to monitor location coordinate of one or more objects. Each independent claim identifies the uniquely distinct combination of features including "a battery power monitor configured to selectively activate and deactivate at least one portion of the transceiver circuitry and location tracking circuitry to conserve battery power in response to a signal level of the at least one portion of the receive communication signal". This patentable distinction is included in all independent claims 1, and 15. The closest prior art, Croyle et al. (US 5,862,511) and Lau et al. (US 5,592,173). Croyle et al. disclose vehicle navigation system and method, and Lau et al. disclose GPS receiver having a low power standby mode. The references, either singularly or in combination, fail to anticipate or render the above limitations obvious.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion.*

Art Unit: 2612

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phung Nguyen whose telephone number is 571-272-2968. The examiner can normally be reached on Monday to Friday from 8:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel J. Wu, can be reached on 571-272-2964. The fax phone number for this Group is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is 571-272-2600.

/PHUNG NGUYEN/

Primary Examiner, Art Unit 2612

Date: June 27, 2012

<b>Notice of References Cited</b>	Application/Control No. 13/356,599	Applicant(s)/Patent Under Reexamination SCALISI ET AL.	
	Examiner PHUNG NGUYEN	Art Unit 2612	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-5,862,511	01-1999	Croyle et al.	701/445
*	B US-5,592,173	01-1997	Lau et al.	342/357.74
*	C US-7,612,663	11-2009	Sun, Chun-I	340/539.3
*	D US-6,774,838	08-2004	Sun, Chun-I	342/357.57
*	E US-2005/0113124	05-2005	Syrjarinne et al.	455/522
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*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.

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 60%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>	<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
<i>Complete if Known</i>													
<b>Application Number</b>	13/356,599												
<b>Filing Date</b>	January 23, 2012												
<b>First Named Inventor</b>	Scalisi, Joseph												
<b>Art Unit</b>	Unknown												
<b>Examiner Name</b>	Unknown												
Sheet 1 of 8	Attorney Docket No: LB1-006USD1												

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
		US-20010030667	10/18/2001	Kelts, Brett R.	
		US-20010048364	12/06/2001	Kalthoff, Robert M., et al.	
		US-20020041328	04/11/2002	LeCompte, Malcolm et al.	
		US-20020067256	06/06/2002	Kail IV, Karl A.	
		US-20020077130	06/20/2002	Owensby, Craig A.	
		US-20020180602	12/05/2002	Yoakum, Jay	
		US-20020186135	12/12/2002	Wagner, Colleen	
		US-20020196123	12/26/2002	Diehl, Joseph R., et al.	
		US-20030043200	03/06/2003	Faieta, Baldo et al.	
		US-20030131073	07/10/2003	Lucovsky, Mark H., et al.	
		US-20030177094	09/18/2003	Needham, Bradford H., et al.	
		US-20030208518	11/06/2003	Gura, Nils et al.	
		US-20030210262	11/13/2003	Gahm, Thomas et al.	
		US-20030212729	11/13/2003	Eberle, Hans et al.	
		US-20030235307	12/25/2003	Miyamoto, Kazuhiro	
		US-20040010689	01/15/2004	Vanstone, Scott A., et al.	
		US-20040021573	02/05/2004	Hoffman, Mark et al.	
		US-20040165726	08/26/2004	Yamamichi, Masato et al.	
		US-20040166879	08/26/2004	Meadows, Vernon et al.	
		US-20040172403	09/02/2004	Steele, Rhea L., et al.	
		US-20040212493	10/28/2004	Stilp, Louis A.	
		US-20050012620	01/20/2005	Yoakum, Jay	
		US-20050024201	02/03/2005	Culpepper, Jerry W., et al.	
		US-20050044356	02/24/2005	Srivastava, Sunil et al.	
		US-20050071282	03/31/2005	Lu, HongQian K., et al.	
		US-20050071736	03/31/2006	Schneider, Tina F., et al.	
		US-20050099303	05/12/2005	Suckerman, Andrew M.	
		US-20050113124	05/26/2005	Syrjarinne, Jari et al.	
		US-20050145688	07/07/2005	Milenkovic, Milan et al.	
		US-20050159883	07/21/2005	Humphries, Laymon S., et al.	
		US-20050181870	08/18/2005	Nguyen, Binh T., et al.	
		US-20050188403	08/25/2005	Kotzin, Michael D.	
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Sheet 3 of 8	Attorney Docket No: LB1-006USD1												

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Examiner Initials*	Cite No <sup>1</sup>	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
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				<b>First Named Inventor</b>	Scalisi, Joseph
				<b>Art Unit</b>	Unknown
				<b>Examiner Name</b>	Unknown
<i>(Use as many sheets as necessary)</i>					
Sheet	8	of	8	Attorney Docket No: LB1-006USD1	

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
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Apple EX1002 Page 125

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Joseph F. Scalisi et al.                      Examiner:                      Unknown  
Serial No.: 13/356,599                                      Group Art Unit:              Unknown  
Filed:                      January 23, 2012                      Docket:                      LB1-006USD1  
Title:                      APPARATUS AND METHOD FOR DETERMINING LOCATION AND  
   TRACKING COORDINATES OF A TRACKING DEVICE

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**INFORMATION DISCLOSURE STATEMENT**

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

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement.

Pursuant to 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicants' prior U.S. application, Serial No. 11969905, filed on January 06, 2008, which is relied upon for an earlier filing date under 35 U.S.C. §120.

Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications, and Non-Published Applications identifiable by USPTO Serial Number, are no longer required to be provided to the Office. Notification of this change to this effect was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004 and October 19, 2004. Thus, Applicant has not included copies of any US Patents or US Patent Applications identifiable by serial number that may be cited with this submission. Should the Office require copies to be provided, Applicant respectfully requests that notice of such

requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

Joseph F. Scalisi et al.

By their Representatives,

Date 5/25/2012

By /Christopher Lattin/  
Christopher Lattin  
Reg. No. 56064

Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 60%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>	<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
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Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
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Substitute for form 1449A/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right;"><i>Complete if Known</i></td> </tr> <tr> <td style="width: 50%;"><b>Application Number</b></td> <td>13/356,599</td> </tr> <tr> <td><b>Filing Date</b></td> <td>January 23, 2012</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td>Scalisi, Joseph</td> </tr> <tr> <td><b>Art Unit</b></td> <td>Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td>Unknown</td> </tr> </table>		<i>Complete if Known</i>		<b>Application Number</b>	13/356,599	<b>Filing Date</b>	January 23, 2012	<b>First Named Inventor</b>	Scalisi, Joseph	<b>Art Unit</b>	Unknown	<b>Examiner Name</b>	Unknown
<i>Complete if Known</i>															
<b>Application Number</b>	13/356,599														
<b>Filing Date</b>	January 23, 2012														
<b>First Named Inventor</b>	Scalisi, Joseph														
<b>Art Unit</b>	Unknown														
<b>Examiner Name</b>	Unknown														
Sheet	5	of	8	Attorney Docket No: LB1-006USD1											

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		<b>Art Unit</b>	Unknown
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	6	of	8
Attorney Docket No: LB1-006USD1			

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Sheet	7	of	8	Attorney Docket No: LB1-006USD1	

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No <sup>1</sup>	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, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		HUFF, GREG H., et al., "Directional Reconfigurable Antennas on Laptop Computers: Simulation, Measurement and Evaluation of Candidate Integration Positions", <u>IEEE Transactions on Antennas</u> , Vol 52, No. 12, (12/2004), pgs 3220-3227	
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				<b>Examiner Name</b>	Unknown	
<i>(Use as many sheets as necessary)</i>						
Sheet	8	of	8	Attorney Docket No: LB1-006USD1		

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Apple EX1002 Page 135

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13356599	<b>Applicant(s)/Patent Under Reexamination</b> SCALISI ET AL.
	<b>Examiner</b> PHUNG NGUYEN	<b>Art Unit</b> 2612

ORIGINAL					INTERNATIONAL CLASSIFICATION														
CLASS		SUBCLASS			CLAIMED					NON-CLAIMED									
340		539.13			G	0	8	B	1 / 08 (2006.0)										
<b>CROSS REFERENCE(S)</b>																			
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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NONE		<b>Total Claims Allowed:</b>	
		24	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/PHUNG NGUYEN/ Primary Examiner. Art Unit 2612	06/27/12	1	3
(Primary Examiner)	(Date)		





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CONFIRMATION NO. 1007

<b>SERIAL NUMBER</b> 13/356,599	<b>FILING or 371(c) DATE</b> 01/23/2012 <b>RULE</b>	<b>CLASS</b> 340	<b>GROUP ART UNIT</b> 2612	<b>ATTORNEY DOCKET NO.</b> LB1-006USD1	
<b>APPLICANTS</b> Joseph F. Scalisi, Yorba Linda, CA; David Butler, Staffordshire, UNITED KINGDOM; Roger B. Anderson, Arcadia, CA; Desiree Mejia, Redondo Beach, CA; Michael L. Beydler, Irvine, CA;					
<b>** CONTINUING DATA *****</b> This application is a DIV of 11/969,905 01/06/2008 PAT 8,102,256				PTN	
<b>** FOREIGN APPLICATIONS *****</b>				PTN	
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b> 02/02/2012					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/PHUNG NGUYEN/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> CA	<b>SHEETS DRAWINGS</b> 3	<b>TOTAL CLAIMS</b> 24	<b>INDEPENDENT CLAIMS</b> 2
<b>ADDRESS</b> Timberline Patent Law Group 108 N. Washington St. Suite 417 Spokane, WA 99201 UNITED STATES					
<b>TITLE</b> APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE					
<b>FILING FEE RECEIVED</b> 650	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	423	(("20010030667") or ("20010048364") or ("20020041328") or ("20020067256") or ("20020077130") or ("20020180602") or ("20020186135") or ("20020196123") or ("20030043200") or ("20030131073") or ("20030177094") or ("20030208518") or ("20030210262") or ("20030212729") or ("20030235307") or ("20040010689") or ("20040021573") or ("20040165726") or ("20040166879") or ("20040172403") or ("20040212493") or ("20050012620") or ("20050024201") or ("20050044356") or ("20050071282") or ("20050071736") or ("20050099303") or ("20050113124") or ("20050145688") or ("20050159883") or ("20050181870") or ("20050188403") or ("20050202830") or ("20050210260") or ("20050246647") or ("20050248459") or ("20060009152") or ("20060084420") or ("20060161377") or ("20060205416") or ("20060206246") or ("20060211405") or ("20030232429") or ("20060253590") or ("20060290497") or ("20070028088") or ("20070033531") or ("20070053513") or ("20070054530") or ("20070057068") or ("20070061303") or ("20070073719") or ("20070083819") or ("20070103296") or ("20070159322") or ("20070229350") or ("20070255620") or ("20070287473") or ("20070288427") or ("20080010585") or ("20080028063") or ("20080059504") or ("20080059889") or ("20080088437") or ("20080090550") or ("20080108370") or ("20080109762") or ("20080129491") or ("20080171559") or ("20080172173") or ("20080227473") or ("20080228654") or ("20080252254") or ("20080252459") or ("20090098857") or ("20090098903") or ("20090103722") or ("20090111393") or ("20090117921") or ("20090119119") or ("20090174603") or ("20090177385") or ("20090189807") or ("20090201127") or ("20090315706") or ("20090315767") or ("20120086571") or ("20120089492") or ("6924102") or ("4218582") or ("4379334") or ("4807453") or ("4850007") or ("4885920") or ("5079841") or ("5127042") or ("5353331") or ("5361612") or ("5386468") or ("5417092") or ("5432542") or ("5490402") or ("5541976") or ("5555286") or ("5563579") or ("5565909") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/06/27 22:02

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S2	4	(( "7181192") or ("7292223")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 16:43
S3	142	(( "20010030667") or ("20010048364") or ("20030041328") or ("20020067256") or	US-PGPUB; USPAT;	OR	OFF	2011/09/15 17:02

IPR2020-01192

Apple EX1002 Page 139

		(("20020077130") or ("20020180602") or ("20020186135") or ("20020196123") or ("20030043200") or ("20030131073") or ("20030208518") or ("20030210262") or ("20030212729") or ("20040010689") or ("20040165726") or ("20040166879") or ("20040172403") or ("20040212493") or ("20050012620") or ("20050071736") or ("20050099303") or ("20050159883") or ("20050181870") or ("20050188403") or ("20050210260") or ("20050246647") or ("20050248459") or ("20060009152") or ("20060205416") or ("20060206246") or ("20060211405") or ("20060232429") or ("20060253590") or ("20060290497") or ("20070028088") or ("20070033531") or ("20070053513") or ("20070054530") or ("20070061303") or ("20070073719") or ("20070083819") or ("20070159322") or ("20070229350") or ("20070255620") or ("20070288427") or ("20080010585") or ("20080028063") or ("20080059504") or ("20080059889") or ("20080088437") or ("20080090550") or ("20080109762") or ("20080129491") or ("20080171559") or ("20080172173") or ("20080252254") or ("20080252459") or ("20090098857") or ("20090098903") or ("20090103722") or ("20090111393") or ("20090117921") or ("20090119119") or ("20090189807") or ("20090201127") or ("20090315706") or ("20090315767") or ("3924102") or ("4379334") or ("4807453")).PN.	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S4	333	((("20010030667") or ("20010048364") or ("20030041328") or ("20020067256") or ("20020077130") or ("20020180602") or ("20020186135") or ("20020196123") or ("20030043200") or ("20030131073") or ("20030208518") or ("20030210262") or ("20030212729") or ("20040010689") or ("20040165726") or ("20040166879") or ("20040172403") or ("20040212493") or ("20050012620") or ("20050071736") or ("20050099303") or ("20050159883") or ("20050181870") or ("20050188403") or ("20050210260") or ("20050246647") or ("20050248459") or ("20060009152") or ("20060205416") or ("20060206246") or ("20060211405") or ("20060232429") or ("20060253590") or ("20060290497") or ("20070028088") or ("20070033531") or ("20070053513") or ("20070054530") or ("20070061303") or ("20070073719") or ("20070083819") or ("20070159322") or ("20070229350") or ("20070255620") or ("20070288427") or ("20080010585") or ("20080028063") or ("20080059504") or ("20080059889") or ("20080088437") or ("20080090550") or ("20080109762") or ("20080129491") or ("20080171559") or ("20080172173") or ("20080252254") or ("20080252459") or ("20090098857") or ("20090098903") or ("20090103722") or ("20090111393") or ("20090117921") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/15 18:13

		("20090119119") or ("20090189807") or ("20090201127") or ("20090315706") or ("20090315767") or ("3924102") or ("4379334") or ("4807453") or ("4850007") or ("4885920") or ("5079541") or ("5127042") or ("5353331") or ("5361612") or ("5386468") or ("5417092") or ("5432542") or ("5490402") or ("5541976") or ("5563579") or ("5565909") or ("5768920") or ("5785181") or ("5876765") or ("5967841") or ("5973599") or ("6088453") or ("6141356") or ("6236365") or ("6330817") or ("6388612") or ("6441741") or ("6445921") or ("6563037") or ("6498797") or ("6546253") or ("6611755") or ("6633835") or ("6674368") or ("6708028") or ("6716101") or ("6731212") or ("6732090") or ("6735630") or ("6747561") or ("6754470") or ("6768942") or ("6778089") or ("6812824") or ("6833787") or ("6850252") or ("6859533") or ("6879244") or ("6885897") or ("6928280") or ("6937726") or ("6998985") or ("6998995") or ("7020701") or ("7038590") or ("7049957") or ("7064711") or ("7065244") or ("7065348") or ("7065370") or ("7079650") or ("7088242") or ("7088252") or ("7109868") or ("7120928")).PN. or ("7139396") or ("7146367") or ("7149189") or ("7155238") or ("7158912") or ("7200673") or ("7218242") or ("7246007") or ("7257836") or ("7272212") or ("7272662") or ("7284191") or ("7299277") or ("7302634") or ("7313825") or ("8501952") or ("7501984") or ("7571628") or ("7598855") or ("7626499") or ("7728724") or ("7823424")).PN.				
S5	2	"20010048364"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/09/16 08:45
S6	1	"9102256"	USPAT	OR	OFF	2012/03/07 16:10
S7	5	"9102256".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:11
S8	10	"8102256".pn.	US-PGPUB;	OR	OFF	2012/03/07

IPR2020-01192

Apple EX1002 Page 141

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:11
S9	2	"7292223".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:14
S10	29	("20020003527"   "20020054011"   "20040095317"   "20040140962"   "4601206"   "4984463"   "5181181"   "5774113"   "5831553"   "5835077"   "5856802"   "5905460"   "5982169"   "6002184"   "6128006"   "6154199"   "6160540"   "6369794"   "6466200"   "6501458"   "6509888"   "6731268"   "6820002"   "6924764"   "6985134"   "7061469").PN. OR ("7292223").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/07 16:15
S11	12	((("6414629") or ("6992584") or ("7119669") or ("7181192") or ("7612663")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:30
S12	2	"6774838".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 16:38
S13	68	(power near2 sav\$3) with (gps) and accelerometer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 19:22
S14	17	("20040169244"   "20050275587"   "20070224951"   "20080012759"   "20090098880"   "20090125517"   "5075693"   "5592173"   "5862511"   "5991692"   "6029111"   "6125325"   "6774838"   "7308272"   "7359713"   "7409219"   "7425918").PN. OR ("8072379").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/07 19:32
S15	240	("4449248"   "5101510"   "5128938"   "5291542"   "5418537"   "5448773").PN. OR ("5592173").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/07 19:45
S16	0	(power near2 sav\$3) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2012/03/07 20:08


			IBM_TDB			
S17	22	(power) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/07 20:08
S18	17	("0139879"   "5448773"   "5493498"   "5650785"   "5857155"   "6067044"   "6121921"   "6133871"   "6384774"   "6480557").PN. OR ("6774838").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/08 12:38
S19	2	"5862511".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:09
S20	0	(power near2 (sav\$3 or conserve or down)) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:15
S21	0	(power near3 (sav\$3 or conserve or down or off)) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:15
S22	0	(power near3 (monitor\$3 or sav\$3 or conserve or down or off)) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:16
S23	0	(battery near2 power near2 monitor\$3) with (gps near3 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:26
S24	26	(battery near2 power near2 monitor\$3) and (gps near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:27
S25	2	"7292223".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:35

S26	2914	(340/539.13,539.21,686.1,636.1).ccls.	USPAT	OR	OFF	2012/03/16 16:55
S27	209	701/400.ccls.	USPAT	OR	OFF	2012/03/16 16:56
S28	7	S26 and ((power near2 sav\$3) with (gps) and accelerometer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:56
S29	0	S27 and ((power near2 sav\$3) with (gps) and accelerometer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/16 16:57
S30	253	(battery near2 monitor\$3) and (gps near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/17 10:01
S31	9	(battery near2 monitor\$3) and (gps near2 weak near2 signal)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/17 10:01
S32	126	("5486831" "6104295" "6191734" "6198696" "3907223" "3805227" "4124865" "4248217" "4295277" "4332238" "4363935" "4364272" "4373185" "4394089" "4432458" "4527198" "4539590" "4574289" "4593406" "4757984" "4792904" "4836672" "4875153" "4922174" "4940245" "4950881" "4993830" "5026009" "5181036" "5193727" "5206697" "5227803" "5266925" "5287177" "5303146" "5313051" "5317309" "5317321" "5321611" "5343391" "5344057" "5404247" "5410519" "5433612" "5433615" "5434617" "5437554" "5448110" "5455619" "5458493" ).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/03/19 12:55

6/ 27/ 2012 10:51:37 PM

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<b>Search Notes</b>  	<b>Application/Control No.</b>  13356599	<b>Applicant(s)/Patent Under Reexamination</b>  SCALISI ET AL.
	<b>Examiner</b>  PHUNG NGUYEN	<b>Art Unit</b>  2612

SEARCHED			
Class	Subclass	Date	Examiner
340	539.13,539.21,686.1,636.1	03/17/12	PTN
701	400	03/17/12	PTN

SEARCH NOTES		
Search Notes	Date	Examiner

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
701	400	03/17/12	PTN

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**Courtesy Reminder for  
Application Serial No: 13/356,599**

Attorney Docket No: LB1-006USD1

Customer Number: 93892

Date of Electronic Notification: 07/30/2012

This is a courtesy reminder that new correspondence is available for this application. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

info@timberlinepatents.com

melissa@timberlinepatents.com

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**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL  
(Submitted Only via EFS-Web)**

Application Number	13/356,599	Filing Date	2012-01-23	Docket Number (if applicable)	LB1-006USD1	Art Unit	2612
First Named Inventor	Joseph F. Scalisi			Examiner Name	Phung Nguyen		

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**  
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

**SUBMISSION REQUIRED UNDER 37 CFR 1.114**

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other \_\_\_\_\_

**MISCELLANEOUS**

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months \_\_\_\_\_  
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other \_\_\_\_\_

**FEES**

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No \_\_\_\_\_

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED**

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Patrick D. S. Reed/	Date (YYYY-MM-DD)	2012-10-30
Name	Patrick Reed	Registration Number	61227

This collection of information is required by 37 CFR 1.114. 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 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.

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

## Privacy Act Statement

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:

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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, 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.
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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.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13356599
<b>Filing Date:</b>	23-Jan-2012
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Attorney Docket Number:</b>	LB1-006USD1

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Request for continued examination	2801	1	465	465
<b>Total in USD (\$)</b>				<b>465</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	14120730
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	31-OCT-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	19:45:29
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

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Payment Type	Credit Card
Payment was successfully received in RAM	\$465
RAM confirmation Number	8338
Deposit Account	
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### File Listing:

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



1	Request for Continued Examination (RCE)	LB1006USD1RCE.pdf	697847	no	3
			204b5e29588e64d29852228deeb9fcd4a4440c4c		
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30600	no	2
			2875696587e2cdbc077619b4db2fe13ba62d009		
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<b>Total Files Size (in bytes):</b>			728447		

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**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.**

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6975941	B1	2005-12-13	Lau et al.	Entire Document
	2	7123189	B2	2006-10-17	Lalik et al.	Entire Document
	3	7826968	B2	2010-11-02	Huang et al.	Entire Document

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	1	2001359147	JP	A	2001-12-26	Miwa et al.	Entire Document	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		13356599
Filing Date		2012-01-23
First Named Inventor	Joseph F. Scalisi	
Art Unit		2612
Examiner Name	Phung NGUYEN	
Attorney Docket Number		LB1-006USD1

2	2002222249	JP	A	2002-08-09	Banba et al.	Entire Document	<input type="checkbox"/>
3	2003284123	JP	A	2003-10-03	Fukuda et al.	Entire Document	<input type="checkbox"/>
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5	2005210204	JP	A	2005-08-04	Uchida	Entire Document	<input type="checkbox"/>
6	2005223436	JP	A	2005-08-18	Fukushima et al.	Entire Document	<input type="checkbox"/>
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( Not for submission under 37 CFR 1.99)

Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

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Attorney Docket Number	LB1-006USD1

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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).

See attached certification statement.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**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	/Patrick D. S. Reed/	Date (YYYY-MM-DD)	2012-11-01
Name/Print	Patrick D. S. Reed	Registration Number	61227

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(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2001-359147  
(P2001-359147A)

(43) 公開日 平成13年12月26日 (2001. 12. 26)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	ページ数 <sup>8</sup> (参考)
H 0 4 Q	7/34	G 0 1 C	21/00 Z 2 F 0 2 9
G 0 1 C	21/00	G 0 8 B	25/10 A 5 C 0 8 7
G 0 8 B	25/10	G 0 8 G	1/13 D 5 H 1 8 0
G 0 8 G	1/13	H 0 4 B	7/26 1 0 6 A 5 K 0 6 7

審査請求 未請求 請求項の数11 O L (全 15 頁) 最終頁に続く

(21) 出願番号 特願2000-397304(P2000-397304)

(22) 出願日 平成12年12月27日 (2000. 12. 27)

(31) 優先権主張番号 特願2000-112806(P2000-112806)

(32) 優先日 平成12年4月14日 (2000. 4. 14)

(33) 優先権主張国 日本 (J P)

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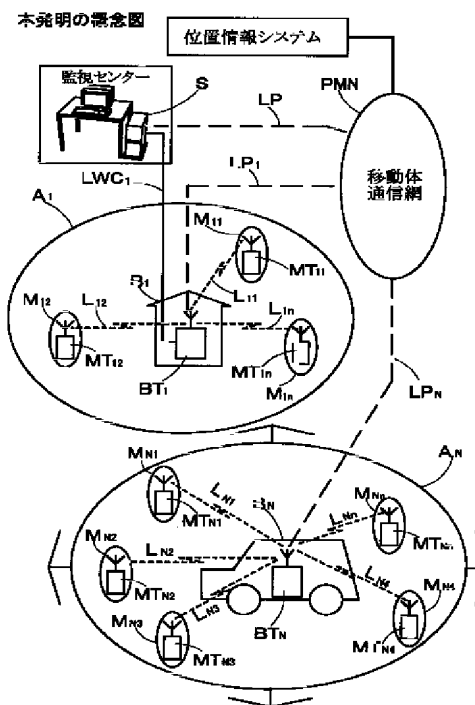
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(54) 【発明の名称】 特定点近傍エリアの移動体の位置監視システム

(57) 【要約】

【課題】 移動体通信端末を徘徊老人等に付設しその位置情報で位置を常時監視し特定点付近安全域から逸脱を監視する場合、移動体通信のセル情報や位置算定情報のみでは精度が悪く誤判定や判定時間遅延が生じる。特に自宅近傍等安全エリアが小な場合誤差の方がより大きくなる問題があった。

【解決手段】 特定基準体に設置した基準体端末と移動体が携行する移動体端末間の相互直接無線交信状況により移動体の特定点近傍エリア逸脱を検知すれば、直ちに保護者や引率者に警報を発すると共にPHSやGPSを用いた位置情報システムに被保護体所在位置の緯度経度算定を依頼し、この結果が予め本発明のシステムに登録済みの正常活動域内か否かを判定して逸脱の場合は警報を発したり、以後の逸脱処理システムに接続するようにしたものである。



## 【特許請求の範囲】

【請求項1】 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体と又はその両者の位置関係を監視する監視センターとを含めてそれぞれに該通信システムの通信端末（他機能に結合、又は内蔵されたものを含めて通信端末と総称する。以下同じ）が設けられ、かつ基準体端末と移動体端末とが相互直接通信機能を併せ有し、基準体端末と移動体端末が直接通信により交信し、その直接交信状況から移動端末の所在が該特定基準体付近（特定点近傍エリア）にあるか否かを移動体端末または基準体端末または監視センタまたは位置情報システムが判定することを特徴とする特定点近傍エリアの移動体の位置監視システム。

【請求項2】 請求項1において特定点近傍エリア内／外の判定又は逸脱を移動体端末または基準体端末から特定基準体、又は監視センタまたは位置情報システムへ通知され、警報を発するか又は以後の移動体位置の測位、追跡、監視、又は捕捉の逸脱処理システムに接続することを特徴とする特定点近傍エリアの移動体の位置監視システム。

【請求項3】 請求項1及び2において基準体端末と移動体端末との直接通信機能が、自管用基地局による（家庭用コードレス電話親機を含む）直接通信機能であることを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項4】 請求項1及び2において基準体端末と移動体端末との直接通信機能が、移動体端末間直接通信（トランシーバ）機能であることを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項5】 請求項1、請求項2、請求項3又は請求項4において移動体端末が基準体端末の近傍（特定点近傍エリア）を逸脱し基準体端末との直接通信での交信が特定の時間または特定回数途絶するか信号強度低下するかまたはBER（ビットエラーレート）の劣化したことにより検知して、自ら起動して又は基準体端末、監視センター又は位置情報システムが逸脱を検知し指令して、移動体端末が公衆・トランシーバ両用または公衆・家庭内両用の待ち受けモードとされることを特徴とする、あるいは予めこの何れかのモードとされており、公衆通信による位置情報、追跡、又は保護システムに接続可能とされている事を特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項6】 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体とに該通信システムの通信端末が設けられ、かつ基準体端末と移動体端末とが直接相互通信機能を併せ有し、基準体端末と移動体端末が直接通信により交信し、その交信状況から移動端末の所在が該特定基準体付近（特定点近傍エリア）にあるか

否かを移動体端末又は基準体端末が判定し特定点近傍エリア外であれば移動体端末、基準体端末、または併設された監視サーバーが位置情報システムに移動体の位置情報の算定を要求し、その結果を移動体端末又は特定基準体端末または基準体監視サーバー（パーソナルコンピュータなど）に返し情報処理することを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項7】 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体とその両者の位置関係を監視する監視センターとに該移動体通信システムを利用した位置情報システムの端末を設け、監視センタで移動体端末の位置情報と、基準体端末が固定の場合はその固定位置と、移動する場合はその基準体端末の位置情報とを取得し移動体端末の基準体端末からの相対位置を監視することを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項8】 自律的識別電波発信機（能動型RFIDタグ）と移動体通信端末（両者を一体としてよい）を1乃至複数の移動体に付設し、一方1乃至複数の能動型RFIDタグ用受信機を、固定または移動する特定基準体に付設された基準体監視サーバーの周辺に配置しかつ該サーバーに接続し、それらの受信可能範囲を合成して特定点近傍エリアとし、能動型RFIDタグ用受信機または基準体監視サーバーは各RFIDタグ所在の該特定点近傍エリアの内か外かを監視し、内／外または外部逸脱を特定基準体に通報しまたは基準体監視サーバーまたは各能動型RFIDタグ受信機がルーターを介して有線または無線通信系により監視センタに報告することを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項9】 請求項8において被探端末逸脱時は基準体監視サーバーまたは監視センターは移動体設置の移動体端末によりまたは位置情報システムを利用して位置探索監視捕捉を行うことを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項10】 照会電波を受信し応答して識別電波を返信する機器（受動型RFIDタグ）と移動体通信端末（両者を一体としてよい）を1または複数の移動体に付設し、一方1または複数の受動型RFIDタグ用送受信機を固定または移動する特定基準体近傍の1乃至複数個所に設置し、特定基準体に付設された基準体監視サーバーに該受動型RFIDタグ用送受信機を接続し、その送受信可能範囲を合成して特定点近傍エリアとし、受動型RFIDタグ送受信機は自律的にまたは基準体監視サーバーの指示により照会電波を発射し、移動体タグの応答を受信した場合は基準体監視サーバーまたは受動型RFIDタグ用送受信機が保持するデータと比較して各RFIDタグの所在が該特定点近傍エリアの内か外かを判別しまたは特定近傍点エリアの出入口に相互に近接して設けた2つの受動型RFID用タグ送受信機の受信タ



イミングから出方向（外部逸脱）か入方向（帰還）かを判別し、内／外または外部逸脱を特定基準体に通報することを特徴とする移動体の特定点近傍エリア位置監視システム。

【請求項11】 請求項10において移動体の特定点近傍の内／外、又は逸脱を基準体監視サーバーまたは受動型RFIDタグ用送受信機がルーターを介して有線または無線通信系により監視センタに報告し、逸脱時は基準体監視サーバーまたは監視センターは移動体設置の移動体端末によりまたは位置情報システムを利用して位置探索監視捕捉することを特徴とする移動体の特定点近傍エリア位置監視システム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は無線技術を利用した物体の流動監視システムに属し、特に徘徊老人や貴重品など移動体の常時監視に関する。具体的には徘徊老人の住居や団体旅行の引率者（特定基準体）に設置した基準体端末と徘徊老人や旅行団員等の移動体が携行する移動体端末間の無線通信状況により移動体のホームエリア（特定点近傍エリア）逸脱を検知すれば、直ちに保護者や引率者に警報を発するか、及び／又はPHSやGPSを用いた位置情報システムに被保護体所在位置の緯度経度算定を依頼し、この結果が予め本発明のシステムに登録済みの正常活動域内か否かを判定して逸脱の場合は警報を発するようにしたものである。

【0002】

【従来の技術】類似目的の技術として特開平9-331571で本発明者は、移動体端末（PHS子機）に予め正常活動域に属する多数の公衆CSIDを登録しておき、所在地点で通信状態が良好なCSIDの複数局の特定割合分が前記登録CSID群に含まれていなければ正常活動域逸脱と判断すると共に待受けモードを公衆からトランシーバまたは公衆トランシーバ両待に変更するものを提案している。この技術では移動体に内蔵するコンピュータシステムにおいて、正常活動域に属する多数の公衆CSIDを登録するための多くの不揮発性メモリー領域を必要とする他、逸脱判定には多数回の比較演算を要し処理が重い。又判定誤りを生じる虞がある。

【0003】また、CSの地図上の位置（緯度／経度）とCSIDに関する情報は原則非公開、且つ頻繁に変更されるので正常活動域に属する多数の公衆CSIDを登録するには、登録しようとする移動体端末を実地に持って行き登録操作を繰り返しながら正常活動域を一巡するなどしなければならず困難を伴う。

【0004】特に移動体の所在地点で通信状態が良好なCSを受信中といえどもマルチパスの影響を受けるのでその受信強度は絶えず変動し、条件が悪いところでは距離換算で数百m以上振れることがあるので、逸脱判定の誤差も数百m以上に及ぶため判定誤りや判定に統計平均

処理上時間的および地理的遅延（逸脱判定遅延）が生じることが大きな問題である。

【0005】特定点近傍エリア逸脱検知を併用せず、セル式移動体通信網（例えばPHS）を利用した位置情報システム提供事業者が、依頼者と予めエリアを取り決めておき、移動体の出入り監視を行うシステム（NTTドコモのPどこ／どこサービス）や、位置情報システム提供事業者（NTTドコモや東芝）に所在位置（緯度経度）の算出を依頼しその結果をパーソナルコンピュータなどで正常活動域の範囲内であるか否かを判定する事も行われている。

【0006】しかしこれらの場合は常時、公衆モードによる移動体の所在位置算定を繰り返して実行し続けなければならないと通信費や位置情報システム使用料などに莫大な経済的負担を伴うほか、上述の位置情報システムでは、位置算定方式が受信電界強度方式／受信時間差方式の何れであってもマルチパスの影響を受け位置算定の誤差は数十mから数百m以上に及ぶので統計的平均時間を含めて逸脱判定遅延が生じる恐れがある。又通信トラフィックを増大し通常の通話を圧迫する。

【0007】またRFIDタグを物流管理に利用する技術の延長として特定点近傍エリア逸脱を検知し警報を発することは可能で既に実施例があるかも知れないが位置情報算定システムと連携し正常活動域の範囲内であるか否かを判定するものは無い。一般的に言ってRFIDタグの電波到達距離は2～3cmから特殊なものでも30m以下と短いので、正常域逸脱判定に利用する場合、犬猫（ペット）に適用すると逸脱警報が頻繁に出過ぎるほか、徘徊老人に適用すると狭所に監禁され人権抑圧されていると受け止められかねない。

【0008】また特定点を自宅等の建屋内と限定してPHSの家庭モード（コードレスモード）と公衆モードとを切り替えて両者の受信強度を比較して建屋内外を判定する方式が特開平11-027734に開示され、また建屋逸脱でアラームを出し管理側装置に通報することが開示されている。これは両モードとも待ち受け状態であるので通信費の発生を防ぐ利点がある。しかし両モードの交互切り替えと両受信強度比較により建屋内外を判定することは複雑でPHS制御装置が別に設けられている。機器の大型化と電池の消耗を早め、かつ高価格化を招くのみならず、公衆基地局の送信電力が200mW、500mW、2Wのものも有り、コードレス親機の送信電力が10mWであるのに対し20倍～200倍と強力である。また、アンテナ利得も公衆基地局の方が大であるため両者の受信電界強度では建屋内外の判定が逆転してしまう場合が多いと言う問題がある。

【0009】また徘徊老人等の自由、安全行動範囲は建屋内に限定されず住宅では庭、施設では構内等、屋外での行動が許されねばならない。これは徘徊者の精神安定上及び肉体的健康上の要請である（呆け老人をかかえる

家族の会)。この庭等の屋外での監視には移動端末にGPS測位機を併設するとしているが、大型化、重量化、高価格化以外に高頻度での位置通信費用がかさむ問題がある。さらに屋外の安全範囲をデータベースとして作成記憶しておく必要があるという問題がある。

【0010】また、公衆移動体通信の電波以外の微弱電波や特定小電力の専用送信機を携行させ、建屋などに設けた受信機で受信状況から外出を検知する装置が市販されているが、この種装置だけでは外出検知後の測位、追跡、監視、補足への接続は不可能であり、あえて接続しようとするならば別途公衆移動体通信対応の携帯端末と前記専用送信機の両方を携行させねばならないという問題がある。

#### 【0011】

【発明が解決しようとする課題】1. 正常活動域登録用の不揮発性メモリー領域の占有を少なくすると同時にコンピュータの処理を軽くする。

2. 正常活動域の登録を簡易、容易にする。

2' 正常活動域範囲の精度を高め、実用上適当な広さの範囲とする。

2'' 建屋内のみでなく屋外も正常活動域に含める。

3. 正常活動域逸脱判定の所在セル特定誤差または位置算定誤差に基づく判定誤りや判定遅延を少なくする。

4. 通信費および位置情報システム使用料などの経済的負担を少なくする。

5. 逸脱警報の頻出と屋内等の狭所監禁による人権抑圧感を払拭する。

#### 【0012】

【問題を解決するための手段】手段1. 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体と又はその両者の位置関係を監視する監視センターとを含めてそれぞれに該通信システムの通信端末（他機能に結合、又は内蔵されたものを含めて通信端末と総称する。以下同じ）が設けられ、かつ基準体端末と移動体端末とが相互直接通信機能を併せ有し、基準体端末と移動体端末が直接通信により交信し、その直接交信状況から移動端末の所在が該特定基準体付近（特定点近傍エリア）にあるか否かを移動体端末または基準体端末または監視センタまたは位置情報システムが判定することを特徴とする特定点近傍エリアの移動体の位置監視システムを用いる。

【0013】手段2. 手段1において特定点近傍エリア内/外の判定又は逸脱を移動体端末または基準体端末から特定基準体、又は監視センタまたは位置情報システムへ通知され、警報を発するか又は以後の移動体位置の測位、追跡、監視、又は捕捉の逸脱処理システムに接続することを特徴とする特定点近傍エリアの移動体の位置監視システムを用いる。

【0014】手段3. 手段1及び手段2において基準体

端末と移動体端末との直接通信機能が、自営用基地局による（家庭用コードレス電話親機を含む）直接通信機能であることを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0015】手段4. 手段1及び手段2において基準体端末と移動体端末との直接通信機能が、移動体端末間直接通信（トランシーバ）機能であることを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0016】手段5. 手段1、手段2、手段3又は手段4において移動体端末が基準体端末の近傍（特定点近傍エリア）を逸脱し基準体端末との直接通信での交信が特定の時間または特定回数途絶するか信号強度低下するかまたはBER（ビットエラーレート）の劣化したことにより検知して、自ら起動して又は基準体端末、監視センター又は位置情報システムが逸脱を検知し指令して、移動体端末が公衆・トランシーバ両用または公衆・家庭内両用の待ち受けモードとされることを特徴とする、あるいは予めこの何れかのモードとされていて、公衆通信による位置情報、追跡、又は保護システムに接続可能とされている事を特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0017】手段6. 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体とに該通信システムの通信端末が設けられ、かつ基準体端末と移動体端末とが直接相互通信機能を併せ有し、基準体端末と移動体端末が直接通信により交信し、その交信状況から移動端末の所在が該特定基準体付近（特定点近傍エリア）にあるか否かを移動体端末又は基準体端末が判定し特定点近傍エリア外であれば移動体端末、基準体端末、または併設された監視サーバーが位置情報システムに移動体の位置情報の算定を要求し、その結果を移動体端末又は特定基準体端末または基準体監視サーバー（パーソナルコンピュータなど）に返し情報処理することを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0018】手段7. 移動体通信システムにおいて固定または移動する特定基準体とその付近（特定点近傍エリア）に活動する単数または複数の移動体とその両者の位置関係を監視する監視センターとに該移動体通信システムを利用した位置情報システムの端末を設け、監視センタで移動体端末の位置情報と、基準体端末が固定の場合はその固定位置と、移動する場合はその基準体端末の位置情報とを取得し移動体端末の基準体端末からの相対位置を監視することを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0019】手段8. 自律的識別電波発信機（能動型RFIDタグ）と移動体通信端末（両者を一体としてよい）を1乃至複数の移動体に付設し、一方1乃至複数の能動型RFIDタグ用受信機を、固定または移動する特定基準体に付設された基準体監視サーバーの周辺に配置しか

つ該サーバーに接続し、それらの受信可能範囲を合成して特定点近傍エリアとし、能動型RFIDタグ用受信機または基準体監視サーバーは各RFIDタグ所在の該特定点近傍エリアの内か外かを監視し、内/外または外部逸脱を特定基準体に通報しまたは基準体監視サーバーまたは各能動型RFIDタグ受信機がルーターを介して有線または無線通信系により監視センタに報告することを特徴とする移動体の特定点近傍エリア位置監視システム。

【0020】手段9. 手段8において被探端末逸脱時は基準体監視サーバーまたは監視センターは移動体設置の移動体端末によりまたは位置情報システムを利用して位置探索監視捕捉を行うことを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0021】手段10. 照会電波を受信し応答して識別電波を返信する機器(受動型RFIDタグ)と移動体通信端末(両者を一体としてよい)を1または複数の移動体に付設し、一方1または複数の受動型RFIDタグ用送受信機を固定または移動する特定基準体近傍の1乃至複数個所に設置し、特定基準体に付設された基準体監視サーバーに該受動型RFIDタグ用送受信機を接続し、その送受信可能範囲を合成して特定点近傍エリアとし、受動型RFIDタグ用送受信機は自律的にまたは基準体監視サーバーの指示により照会電波を発射し、移動体タグの応答を受信した場合は基準体監視サーバーまたは受動型RFIDタグ用送受信機が保持するデータと比較して各RFIDタグの所在が該特定点近傍エリアの内か外かを判別しまたは特定近傍点エリアの出入口に相互に近接して設けた2つの受動型RFIDタグ用送受信機の受信タイミングから出方向(外部逸脱)か入方向(帰還)かを判別し、内/外または外部逸脱を特定基準体に通報することを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0022】手段11. 手段10において移動体の特定点近傍の内/外、又は逸脱を基準体監視サーバーまたは受動型RFIDタグ用送受信機がルーターを介して有線または無線通信系により監視センタに報告し、逸脱時は基準体監視サーバーまたは監視センターは移動体設置の移動体端末によりまたは位置情報システムを利用して位置探索監視捕捉することを特徴とする移動体の特定点近傍エリア位置監視システムを用いる。

【0023】

【発明の実施の形態】先ず本発明明細書のうち手段1～手段7で使用している主な用語について定義する。移動体通信システムとはPHS・PDC/CDMA/WCDMA方式などの携帯電話・通信衛星を用いた公衆移動体通信のほかタクシー無線・MCA無線などを総括したものであり本発明が適用される範囲である。

【0024】またこれらにコンピュータ技術を併用して形成される上位概念のインターネットやiモード等を

利用することも含まれる。以下例としてPHSシステムにより説明するがPHSに限定されるものではない。

【0025】特定基準体とは固定的な施設(老人ホーム・グループホーム・病院・企業などの事業所/倉庫・金融機関・一般家庭など)と移動するバスなどの車両などの施設およびその施設に設けた通信端末などの設備とその管理者・保護者・団体旅行の引率者などを包括する概念である。

【0026】特定点近傍エリアとは前記の特定基準体の周辺地域、移動体とは徘徊老人・貴重品を収納したバックパック・犬猫などのペット・現金輸送車など、監視センターとはこれらの移動体の動向を広域的に監視する個人や事業体でPHSやGPSを用いた位置算定システムを併設しても良い、通信端末とはこのPHSシステムの例では基本的にはPS(子機)・自家用CS(コードレス電話の親機)であるがPHS網と交信するための有線通信端末(無線アクセス回線終端装置等を含む)であっても良い。

【0027】公衆通信以外の相互直接通信機能とは本例では子機間直接(トランシーバ)通話機能(データのみの通信を含む)または自家用CSを用いた(コードレス電話)内線通話機能(データのみの通信を含む)、基準体端末とは特定基準体に設けられる前記の通信端末の1種で本例ではPSまたは自家用CS、移動体端末とは同様に通信端末の1種で本例ではPSであるが音声通話のための送話器・受話器・コーデックなどは無くてもよい。

【0028】直接通信により交信とは本例ではPHS標準規格RCR-STD-28に規定されている無線管理/移動管理などのためのメッセージおよび/またはトランシーバ通話のための呼出メッセージ・同期メッセージなどの交信あるいは実際の呼接続手順の実行でも良く、適宜時間間隔等にプログラムされて順次移動体を走査する直接通信である。なお、PHS以外のセル方式公衆移動体通信システムにおいても規格書の番号は異なるが内容は類似していることは言うまでもない。

【0029】位置情報システムとは、セル方式の移動体通信システムにおいて、移動体端末と交信可能なセル局の受信信号強度をもとに移動体端末の地図上の所在位置を得る方式、複数のセル局との電波伝播時間から移動体端末の地図上の所在位置を得る方式、および移動体端末に内蔵又は接続したGPS(Global Positioning System)を用い移動体端末の地図上の所在位置を得る方式などの総称である。

【0030】基準体併設サーバーとは固定的な特定基準体および/または移動する特定基準体に設けた例えばパーソナルコンピュータシステム(図2BSS<sub>M</sub>)やワークステーションや携帯情報端末(PDA)などから構成され、有線または/および無線回線で監視センター(位置情報算定システムを含む)と交信する機能を有し基準

体端末と連携してより高度なサービスを提供するとともに基準体端末の負荷を低減するもので、通信回線は公衆網や専用回線でも良く、また回線交換とは限らず公衆移動体を含むインターネット・プロトコル(TCP/IP)でも良い。

【0031】次に手段1～手段7に対応する図について説明する。図1は本発明の実施例の概念図、また図2は手段1～手段7に対応する特定基準体の実施例でM番目の特定基準体を示すブロック図である。図1において $A_1 \sim A_N$ は特定点近傍エリアで $A_1$ は固定エリアを $A_N$ は移動するエリアを示す、 $B_1 \sim B_N$ は特定基準体、 $BT_1 \sim BT_N$ は夫々の特定基準体に設けた基準体端末(本例ではPHSのPS(子機)や自営用CS(コードレス電話親機))である。

【0032】 $LP_1 \sim LP_N$ は各基準体端末と監視センターを結ぶ公衆移動体通信回線または専用無線通信回線またはMCA無線など、 $LWC_1$ は固定的な基準体端末 $BT_1$ と監視センターを結ぶ有線系の公衆または専用通信回線(光ケーブルや無線アクセス回線を含む且つインターネット・プロトコルを含む)、 $L_{11} \sim L_{1n}$ および $L_{N1} \sim L_{Nn}$ は夫々の移動体端末と基準体端末を結ぶ非公衆モード相互直接通信(本例ではコードレス電話の内線またはPHSの子機間直接(トランシーバ)通話用無線リンク)である。

【0033】 $M_{11} \sim M_{1n}$ および $M_{N1} \sim M_{Nn}$ は夫々の特定点近傍エリアに活動する移動体、 $MT_{11} \sim MT_{1n}$ および $MT_{N1} \sim MT_{Nn}$ は前記の移動体に設けられる移動体端末(本例ではPHSのPS(子機)、PMNは公衆移動体通信網、Sは監視センターに設けた通信端末(公衆移動体通信端末、専用無線通信端末、有線系公衆通信端末、有線系専用通信端末などで当然のことながらルーター機能を持っていて良い)とコンピュータシステム)である。

【0034】図2において $ALT_M$ は放音機・ランプなどからなる特定基準体に逸脱を通知する警報装置、 $BT_M$ はM番目の基準体端末(本例ではコードレス電話の親機やPHSのPSなど)、 $BSS_M$ は基準体サーバー、 $BS_M$ はパーソナルコンピュータなど、 $DIS_M$ はCRT/LCDなどの表示装置、 $KEY_M$ はキーボード・マウスなどの入力装置である。

【0035】 $LM_1 \sim LM_n$ は非公衆モード相互直接通信(例えばコードレス電話の内線またはPHSの子機間直接(トランシーバ)用無線リンク、 $LP_M$ および $LP_{M1} \sim LP_{Mn}$ は位置算定依頼などの場合に張られる公衆モード無線リンク(パケット・データ通信を含む)、 $LWC_M$ は基準体端末 $BT_M$ の非公衆モード相互直接通信機能がコードレス電話の内線で有る場合の有線通信回線、 $LWS_M$ は基準体サーバーが監視センターや位置算定事業者のサーバーと通信する際の有線通信回線(無線アクセス回線を含む)、PMNは公衆移動体通信

網、WNはISDN・PSTN・DSL・CATV・光ケーブルなどの有線通信網、 $MT_{M1} \sim MT_{Mn}$ は特定点近傍エリアに活動する移動体に設けた移動体端末(本例ではPHSのPS(子機))である。

【0036】以下手段1～手段67の実施態様について説明する。本発明は図1に示すように固定的な特定基準体(老人ホーム・グループホーム・病院・企業の事業所・一般家庭など)や移動する特定基準体(バスなどの車両・団体旅行の引率者など)に設置した基準体端末と特定基準体の近傍(特定点近傍エリア)に活動する移動体が携行する移動体端末間の無線交信状況により移動体の特定点近傍エリア逸脱を検知すれば、直ちに特定基準体(管理者・保護者・引率者など)および/または監視センターに通知するとともにPHSやGPS(この場合は移動体がGPSを複合している)を用いた位置情報システムに特定点近傍エリアを逸脱した移動体端末の所在位置の緯度経度算定を依頼し、この結果が予め本発明の監視システムに登録済みの正常活動域内か否かを判定し特定基準体に通知および/または警報を発するようにしたものである。

【0037】態様1(手段1): 基準体端末からの着識別符号(PSIDなど移動体端末を識別するための符号)を指定してのプログラムされた直接通信による交信で、

1. 該PSID等を有する移動体端末の応答が所定時間待っても無い
2. 基準体端末で受信した該PSID等を有する移動体端末からの応答の望ましくは100フレーム程度の平均化した信号強度低下または/およびBER(ビットエラーレート)の劣化または/および劣化の所定時間継続
3. 該PSID等を有する移動体端末から報告された基準体端末の望ましくは100フレーム程度の平均化した信号強度低下または/およびBER(ビットエラーレート)の劣化または/および劣化の所定時間継続上記の何れか1つ以上の状況が認められた場合に基準体端末自身は交信を試みたPSID等を有する移動体端末が特定点近傍エリア外又は逸脱したと判定するか、監視センター又は/及び位置情報システム自身が上記をモニターして自ら、又は基準体端末又は/及び上記移動体端末から通知され、上記移動体端末が特定点近傍エリア外又は逸脱したと判定する。

【0038】また前記3項全てが認められない場合は特定点近傍エリア内又は復帰したと判定することは言うまでもない。

【0039】態様2(手段2): 態様1で特定点近傍エリア外又は逸脱と自ら判定又は通知を受けた特定基準体、監視センター、又は位置情報システムは可聴的・可視的・機械的振動などの手段で警報を出し、移動体位置の測位と追跡を開始する。移動体の位置と予め本発明の監視システム、ASP(Application Se

ervice Provider、又は位置情報システム等に登録されている危険エリアを照合し危険度に応じて、より高いレベルの警報を発生したり、より高頻度の位置算定や補足出動を要請する。

【0040】態様3(手段3)：基準体端末がPHSの自営用CS(家庭用では通称親機)、移動体端末がPHSのPS(家庭用では通称子機)であってPSは自営待受け(通称は家庭待受け)または公衆/自営両待ちモードに設定されている。自営用CSは例えばPS番号(PSID)等を指定して「無線状態問合せ」メッセージを各PSに順次送出しPSから「無線状態報告」を待つ、この時にPSからの無線状態報告が所定時間内に受信できないか、CSで受信したPSの電波の信号強度が所定値以下または/およびBER(ビットエラーレート)の劣化した場合、または「無線状態報告」で返されるPSで受信したCSの電波の信号強度が所定の値以下または/およびBER(ビットエラーレート)が劣化した場合に特定点近傍エリア外と判断して直ちに無線チャンネル切断メッセージまたはPS開放メッセージ送出する。但しPSからの応答(より低いレイヤーの応答や「無線状態報告」)がCSで受信できない場合は所定の間隔(例えば30m秒)で再試行する。

【0041】一方「無線状態報告」で返されるPSで受信したCSの電波の信号強度が所定の値以上または/およびBER(ビットエラーレート)が良好の場合は特定点近傍エリア内と判断し電池消費を避けるために直ちに無線チャンネル切断メッセージまたはPS開放メッセージを送出する。

【0042】以上の処理を該CSと同一特定基準体に属する1つまたは複数のPSまたは監視すべく登録されている1つまたは複数のPSについて順次繰り返す。一巡に要する時間は移動体の移動速度とPSの電池消費を勘案して例えば1分程度とする。監視すべきPSの数が多く一巡に要する時間が長くなり過ぎる場合はCSを複数用いPSを各CSに分担させる。

【0043】また、実際にPSを内線で呼出し「同期」メッセージ(リングバック音)が受信できるか否かで判断しても、あるいはもっと低いレイヤーのリンクチャンネル確立フェーズだけで判断しても良く電池節約になる。

【0044】特に自営用CSが複数存在する老人ホームや病院などではPS自身が保持する位置登録情報(CSID、受信電界強度など)を定期的(例えば1分毎)に更新し、この位置登録情報に含まれるCS電波のPSでの受信信号強度が所定の値以下に下がるとPSが自律的に所定のインターバルで受信信号強度をCSに報告するようにしても良い。

【0045】この場合はPSから報告された受信信号強度が所定の値以下になるか、PSからの電波をCSで受信した望ましくは平均した信号強度が所定の値以下または/およびBER(ビットエラーレート)が劣化した

か、PSとの交信が所定時間以上途絶した場合に特定点近傍エリア外と判断し望ましくは直ちにPSに対し「無線チャンネル切断メッセージ」を送出する、この方法は家庭用コードレス電話にも適用できることは言うまでもない。

【0046】特定点近傍エリア逸脱と判断された場合以降は手段2と同じである。

【0047】態様4(手段4)：基準体端末および移動体端末は共にPHSのPS(子機)であり基準体端末はトランシーバモードに、移動体端末はトランシーバモードまたは公衆/トランシーバ両待ちモードに設定されているものとする。基準体端末はキャリアセンスして使用可能な無線チャンネル(キャリア周波数とタイムスロット番号)を知り、この無線チャンネルの下りスロットを用いて移動体端末のトランシーバ番号を指定して「呼出しメッセージ」を例えば2秒間(最大10秒)送出する。

【0048】この間同一無線チャンネルの上りスロットで待っても移動体端末から上り「同期メッセージ」が返って来ないか、上り「同期メッセージ」電波の基準体端末での望ましくは平均した受信信号強度が所定値以下である場合または/およびBER(ビットエラーレート)が劣化した場合は特定点近傍エリア外と判断する。

【0049】一方上り「同期メッセージ」電波の基準体端末での望ましくは平均した受信信号強度が所定値以上または/およびBER(ビットエラーレート)が良好であれば特定点近傍エリア内と判断する。望ましくは何れの場合も判断後直ちに移動体端末へ「無線チャンネル切断メッセージ」を送出する。この処理を該特定基準体に属する全ての移動体端末または/および監視すべく登録されている移動体端末に対し順次繰り返す。

【0050】特定点近傍エリア逸脱と判断された場合以降は手段2と同じである。

【0051】態様5(手段5)：手段1、手段2、手段3および手段4において、特定点近傍エリアを逸脱した場合に移動体端末自身が基準体端末からの信号受信が所定の時間途絶えるか信号強度低下または/およびBER(ビットエラーレート)が劣化した場合または/および基準体端末が逸脱と判定して指令メッセージを一方向的に送信しているのを受信できた場合に移動体端末が、

1. 自営待受けモードであった場合
  2. トランシーバ待受けモードであった場合
  3. 自営/公衆両待ちモードであった場合
- の何れの場合も公衆/トランシーバ両待ちまたは公衆待受けモードとなるよう内蔵コンピュータシステムのプログラムで制御する。あるいは予めこれらの何れかのモードに固定的に設定されていてもよい。これは公衆モードによる位置情報算定と以降のトランシーバモードによる位置探索に備えるためである。

【0052】態様6(手段6)：基準体監視サーバー(コンピュータ：図2のBS<sub>M</sub>)または/および基準体

端末内蔵コンピュータシステムには予め正常活動領域などの情報を家族からの申請に基づく監視センターからのデーター通信によりまたは表示装置(図2のD I S<sub>M</sub>)に表示された地図の正常活動領域を囲む複数点をマウスでポイント(プロット)するなどの方法により登録しておく、(正常活動域として記録されるのは主として緯度経度の数値である。例えば円の中心と半径、多角形や矩形の頂点、それらの組合せ等)

【0053】なお正常活動領域登録が上記の方法で可能な理由は、通常C S I Dと地図上の位置関係は位置情報算定システム運用事業者が移動体通信事業者から特別な契約により開示を受け絶えずメンテナンスされ且つ、位置情報算定依頼に対する回答が「緯度経度および/またはX区X町X丁目付近」という形で提供されることによる。

【0054】基準体端末内蔵コンピュータシステムには前記の方法で予め登録した正常活動領域情報をダウンロードするか基準体端末内蔵コンピュータシステムが地図を表示可能な表示装置とペンタッチパネルなどの入力装置を有する場合はB S<sub>M</sub>に登録したのと同様の方法で正常活動領域情報を登録しても良い。

【0055】手段1、手段2、手段3および手段4において特定点近傍エリアを逸脱した移動体端末が検出された場合、基準体端末内蔵のコンピュータシステム(図2参照)自体が自らのプログラムにより位置情報算定システムのサーバーまたは位置情報算定サービスプロバイダーに接続して逸脱したP S番号を指定して所在位置(緯度経度)の算定を依頼する。

【0056】あるいは特定基準体に併設したサーバーシステム(図2のB S S<sub>M</sub>)のコンピュータ(図2のB S<sub>M</sub>)に逸脱した移動体端末のP S I Dを報告し、報告を受けたB S<sub>M</sub>は自身が持つプログラムにより位置情報算定システムのサーバーまたは位置情報算定サービスプロバイダーに接続して逸脱したP S番号を指定して所在位置(緯度経度)の算定を依頼する。

【0057】位置情報算定システムのサーバーまたは位置情報算定サービスプロバイダーから位置算定結果が返されたら、基準体端末内蔵のコンピュータシステムまたは/および特定基準体に併設したサーバーシステム(図2のB S S<sub>M</sub>)のコンピュータ(図2のB S<sub>M</sub>)は夫々が内蔵するプログラムと地図データーを用い逸脱した移動体端末の現在位置や軌跡を表示したり、予め登録されている正常活動領域情報と比較して危険度を算定したり警報を出したりする。この場合に基準体端末内蔵のコンピュータシステムのメモリーを節約するためプログラムの一部や地図データーは必要に応じて監視センターから必要分のみダウンロードするようにしても良い。

【0058】態様7(手段7): 図1、図2では省略されているが特定基準体が移動する場合はGPSまたは/およびセル構造を利用した位置情報算定システムを用

い移動する特定基準体の動的自己位置を知る、言うまでもなく固定的な特定基準体では自己位置は地図でも容易に知ることが出来る、これらの手段で取得した特定基準体自己位置と位置情報算定システムで取得した移動体端末の現在位置から特定基準体自己位置に対する移動体端末の相対的な現在位置を知り監視するようにしたものである。

【0059】手段4の例ではP H Sトランシーバの通信可能距離は道路沿い街区で半径200~300mである。これが特定点近傍エリアの半径となる。これより広い広域エリアにたいしては複数の特定点近傍エリアを希望する広域をカバーするようにつなげるべく重複を避けて隣接配置すればよい。一部の重複、欠如は問題ではない。所要広域内の欠如部は周りを特定点エリア群で取り囲まれていけばよい。

【0060】広域を構成する複数の特定点近傍エリアの基準体端末は夫々監視センターに通信回線で接続されてもよいし、広域を管理する監視サーバに有線または無線で接続されてもよい。相互に離隔した地域に夫々別の特定点近傍エリア監視システムが設けられてよいことは勿論である。

【0061】続いて手段8~手段11について説明する。先ず手段8~手段11の説明で用いる主な用語について定義する、但し手段1~手段7で定義済みのものは省略する。自律的識別電波発信機(能動型RF I Dタグ)とは例えばE-Code社の商品名がSpider RF I D(Radio Frequency Identification以下ATと言う)のように内蔵電池を電源として識別(ID)コードで変調された300MHz帯の電波を所定のインターバルで間歇的に発射し続ける小型の無線発信機等で図4のA T<sub>M 1</sub>~A T<sub>M n</sub>がこれに相当する。

【0062】能動型RF I Dタグ用受信機とは例えば同社の商品名がSpider Readerと称するものがあり、これは受信衝突防止技術により見かけ上同時に複数の能動型RF I Dタグからの電波を受信しそれらの識別コード(以下タグID群と言う)をメモリーに保存、更新できる。

【0063】旧モデルはR S-232C、新モデルはL A Nインターフェースを有しそのタグID群がL A Nなどを介してサーバーに通知または/およびサーバーなどから読み出し可能としたもので、以下R Xと称し図4のR X<sub>M 1</sub>~R X<sub>M n</sub>がこれに相当する。A TとR Xを組合せた場合の電波到達距離は~30m以内(遠距離に設定の場合)である。

【0064】照会電波を受信して識別電波を返信する機器(受動型RF I Dタグ(図5のP T<sub>M 1</sub>~P T<sub>M n</sub>に相当)とは受信した電波のエネルギーを利用して識別コードで変調された電波を返信する荷札(シート)状の無線機で具体例としてはE-Code社のP F 10 RF

IDタグなどがあり以下略してPTと言う。

【0065】受動型RFIDタグ用送受信機とは例えばE-Code社のUnified Monitoring System (以下UMSと言う)などで一般的にはリーダーと称され1〜数本のアンテナを順次制御しながら2〜13.56MHzのRF信号を送信し受動型RFIDタグからの返信が受信(識別コード=タグID検出)した場合はこのタグIDをRS-232CポートまたはLANに出力するバーコードリーダーに類似の機能を有するものである。なおUMSとPTの組合せによる電波到達距離は最大3mとなっている。

【0066】以上 自律的識別電波発信機(能動型RFIDタグ)、能動型RFIDタグ用受信機、照会電波を受信して識別電波を返信する機器(受動型RFIDタグおよび受動型RFIDタグ用送受信機についてはE-Code社の製品を例に説明したが同等機能の他社製品であっても良いのは言うまでもない。)

【0067】また照会電波を受信して識別電波を返信する機器(受動型RFIDタグ)および受動型RFIDタグ用送受信機には電波ではなく電磁誘導を用いた例えば日本アビオニクス株式会社製Avio RFIDトランスポンダーと自社製MaxiProxリーダーなどでも良い。

【0068】受信可能範囲を合成とは電波到達距離が能動型で30m受動型では3m以下と比較的短いために1台のRXだけでは特定点近傍エリアが狭小となる、これを解決するためRX(UMSでは複数アンテナを含む)を特定点近傍エリアとしたい範囲に電波到達距離の1.5倍程度の間隔で隈なく複数配置し全RXのタグID群(能動型の場合)または全UMSから報告されたタグIDについて論理和を取ることである。

【0069】ルーターとは特定点近傍エリア内のLAN(Local Area Network)と外部の通信回線(専用線・公衆回線)間のプロトコル変換および通信機能を有するゲートウェイで公衆回線の場合はダイヤルアップ接続機能を有するものとし、その通信手段は特定点近傍エリアが固定的な場合は主として有線系通信回線(無線アクセス回線を含む)、特定点近傍エリアが移動する場合は無線系通信回線を用いるものである。

【0070】次に手段8〜手段11に対応する図について説明する。図3は手段8〜手段11の概念図、また図4は合成した特定点近傍エリア構成例(手段8および手段10前半)、図5は建屋または門扉当て囲まれた特定点近傍エリアの構成例(手段10後半)である。

【0071】図3において $A'_1 \sim A'_N$ は特定点近傍エリアを示すが、下記は省略されている。即ちLANに接続されているRX(能動型RFIDタグ用受信機)およびUMS(受動型RFIDタグ用送受信機)と位置情報算定時依頼時に張られる移動体端末(PS)と公衆移動体通信網の無線リンクの記載は省略されている。

【0072】 $B_1 \sim B_N$ は特定基準体、 $BS_1$ から $BS_N$ は基準体監視サーバーとして用いる例えばノート型パーソナルコンピュータ、 $LAN_1 \sim LAN_N$ は有線または/および無線ローカルエリアネットワーク(トランシーバ、HUBなどを含む)、 $LX$ はNW(通信網)と監視センターを結ぶ通信回線で有線/無線の別や公衆/専用の別は何れであっても、インターネットであっても良いことは言うまでもない。

【0073】 $LX_1 \sim LX_N$ は夫々の特定基準体とNW(通信網)を結ぶ通信回線で特定点近傍エリアが固定的な場合は主として有線系通信回線(無線アクセス回線を含む)、特定点近傍エリアが移動する場合は無線系通信回線である。

【0074】 $M_{11}$ から $M_{1n}$ および $M_{N1} \sim M_{Nn}$ は $A'_1 \sim A'_N$ の特定点近傍エリアに活動する移動体で移動体通信端末MTとタグRFIDを設置されている。 $NC_1 \sim NC_N$ はネットワークインターフェースカード、NWは通信網で有線/無線/公衆/専用を包含し特定点近傍エリアが固定的な場合は主として有線系通信網がまた特定点近傍エリアが移動する場合は無線系通信網が使用される。

【0075】 $RT_1 \sim RT_N$ はルーターで $LAN_1 \sim LAN_N$ と外部の通信回線(専用線・公衆回線)間のプロトコル変換と通信機能を有するゲートウェイで公衆回線の場合はダイヤルアップ接続機能を有するものとしその通信手段は特定点近傍エリアが固定的な場合は主として有線系通信回線(無線アクセス回線を含む)、特定点近傍エリアが移動する場合は無線系通信回線が用いられる。

【0076】図4において $A'_M$ はM番目の特定点近傍エリア、 $AT_{M1} \sim AT_{Mn}$ はAT(能動型RFIDタグ)、 $B_M$ はM番目の特定基準体、 $BS_M$ はM番目の基準体サーバー、 $LAN_M$ はM番目の特定点近傍エリア内の有線または/および無線ローカルエリアネットワーク、 $LX_M$ は図3で説明した $LX_1 \sim LX_N$ の内のM番目である。

【0077】 $M_{M1}$ から $M_{Mn}$ はM番目の特定点近傍エリアに活動する移動体、 $MT_{M1}$ から $MT_{Mn}$ は夫々の移動体に設けた公衆移動体通信用の移動体端末(PS)、 $NC_M$ はM番目の基準体サーバーに付設されているネットワークインターフェースカード、 $RX_{M1}$ から $RX_{Mn}$ はRX(能動型RFIDタグ用受信機)である。

【0078】続いて図5を説明する。但し図4と同一のものは説明を省略する。 $G_{M1} \sim G_{Mn}$ はM番目の特定点近傍エリアの出入口に設けたゲートで2本または $2n$ 本のアンテナとUMS(受動型RFID用送受信機、図示されているが名称は記入してない)の幅が電波到達距離に比較して狭ければ2本(即ち $N=1$ )だけでよく広ければ $n$ の値を大きくする。図示例では $n=2$ である。

【0079】以下手段8～手段11の実施態様について説明する。態様8（手段8）：図4に示すように夫々の移動体 $M_{N1} \sim M_{Nn}$ には公衆移動体通信端末 $MT_{Mi}$ （ $i=1 \sim n$ ）（例えばPHS用PS）と $AT_{M1} \sim AT_{Mn}$ （能動型RFIDタグ）が併設されている、図4では分離して描いてあるがAT（能動型RFIDタグ）は極めて小型であるのでPSに内蔵しても良い。

【0080】AT（能動型RFIDタグ）とRX（能動型RFIDタグ用受信機）の電波到達距離は用語の定義で説明したE-Code社の製品の組合せでは最大30mであるので半径30mの範囲が1台の受信機でカバーできることになるが安全を見て40m方眼状に配置すればX方向のグリッド数=X、Y方向のグリッド数Yとすると $(20+40X+20)(20+40Y+20)$ 平方メートルの面積を特定点近傍エリアと見なすことが出来る。あるいは特定点近傍エリアの周辺にそって線状に配置し、その形成する帯状エリアに限定することもできる。

【0081】基準体サーバー（ $BS_M$ ）には予め各移動体に設置されているPSの識別コード（PSID）または／およびPS電話番号とタグID（RFIDタグの識別コード）の組合せおよび該基準体サーバー（ $BS_M$ ）が監視すべきタグIDまたは／およびPS電話番号、PSIDなどのデータベースを構築しておく。

【0082】各RXは用語の定義で説明したように複数のATからの送信を見かけ上同時に受信でき且つ受信できたタグIDをメモリーに受信する都度更新記憶するようにされているので基準体サーバー $BS_M$ がエリア内の全てのRXが夫々のメモリーに記憶しているタグID群を所定のインターバルで順次読み出し論理和を取ればエリア内に現存する全AT即ち移動体（PSIDまたは／およびPS電話番号）を把握できる。

【0083】該基準体サーバー（ $BS_M$ ）は自己が保持するデータベースの監視すべきタグIDまたは／およびPS電話番号、PSIDなどの情報と現存する全AT即ち移動体（PSIDまたは／およびPS電話番号）を比較すれば特定点近傍エリアの内／外又は逸脱／復帰した移動体（PSIDまたは／およびPS電話番号）を検知できるのは言うまでもない。

【0084】また特定点近傍エリアが比較的小さい場合は各RXに自身が監視すべきタグIDとPSIDまたは／およびPS電話番号を記憶しておけば上記と同様に現存する全ATのタグIDと比較照合することで特定点近傍エリア内／外又は逸脱／復帰した移動体を特定できることは言うまでもない。

【0085】上記の説明で検知した移動体の所在状況をRX自身又は／及び基準体監視サーバーがルーターを介して監視センター又は／及び位置情報システムに通知する。

【0086】態様9（手段9）：態様8において移動体

が特定点近傍エリア逸脱時は、基準体監視サーバー自身が又は通知された監視センター又は位置情報システムは逸脱したPSの待受けモードを公衆／トランシーバ両待ちモードに変更し可聴的・可視的・機械的振動などの手段で基準体に警報を出し、位置情報システムの機能を利用して移動体位置の測位と追跡を開始する。移動体の位置と予め本発明の監視センター、ASP（Application Service Provider、又は位置情報システム等に登録されている危険エリアを照合し危険度に応じて、より高いレベルの警報を発生したり、補足出動する。

【0087】また態様6（手段6）で説明した事項を基準体端末内蔵コンピュータシステムに関する記述を除けば実施可能であるのは言うまでもない。

【0088】態様10（手段10）：図4の夫々の移動体 $M_{N1} \sim M_{Nn}$ に併設されている $AT_{M1} \sim AT_{Mn}$ （能動型RFIDタグ）を $PT_{M1} \sim PT_{Mn}$ （受動型RFIDタグ）に且つ能動型RFIDタグ用受信機 $RX_{M1} \sim RX_{Mn}$ を1つまたは複数のUSM（受動型RFIDタグ用送受信機）に置き換える。公衆移動体通信端末（例えばPHS用PS）と $PT_{M1} \sim PT_{Mn}$ （受動型RFIDタグ）は図4および図5では分離して描いてあるがPT（受動型RFIDタグ）は小型かつシート状であるのでPSに内蔵または貼付しても良い。

【0089】PT（受動型RFIDタグ）とUMS（受動型RFIDタグ用送受信機）の電波到達距離は用語の定義で説明したE-Code社の製品の組合せでは最大3mであるので半径3mの範囲が1台の受信機でカバーできることになるが安全を見て2m四方が電波到達範囲とする。

【0090】手段8同様に複数のアンテナ（数本毎にUMSに接続）を4m間隔の方眼状に配置すればX方向のグリッド数=X、Y方向のグリッド数Yとすると $(2+4X+2)(2+4Y+2)$ 平方メートルの面積を特定点近傍エリアと見なすことが出来、これ以降はUMSが検知報告する個々のタグIDを基準体サーバーまたは監視センターが処理する点を除けば手段8と何ら変わることはない。あるいは特定点近傍エリアの周辺にそって線状に配置し、その形成する帯状エリアに限定することもできる。

【0091】次に図5について説明する。図5は特定点近傍エリアが1つの建屋または1つの門塀等で囲まれた構内の場合である。 $G_{M1} \sim G_{Mn}$ は用語の説明で既述のように2本または2n本のアンテナとUMS（受動型RFID用送受信機）から構成されている、アンテナ数は内側と外側の2本が最小単位で出入口通路の幅が電波到達距離に比較して狭ければ2本（即ち $N=1$ ）だけでよく広ければnの値を大きくする（図5では全て $n=2$ となっている）。

【0092】移動体（ $M_{M1} \sim M_{Mn}$ の何れか）が内側



から扉を通過して外側に移動するとUMSは2本一組のアンテナの先ず内側のアンテナが移動体に併設されているPTのタグIDを検出するのでそのタグIDとアンテナ位置をBS<sub>M</sub>(基準体サーバー)または監視センターに報告する、続いて外側のアンテナがタグIDを検出するのでそのタグIDとアンテナ位置をBS<sub>M</sub>(基準体サーバー)または監視センターに報告することになる。

【0093】BS<sub>M</sub>(基準体サーバー)または監視センターはこの該タグIDを検出したアンテナの順序から該移動体が特定点近傍エリアから逸脱したと判断できる。同様に外側のアンテナが先にタグIDを検出し続いて内側のアンテナがタグIDを検出した場合は該タグIDを有するPTを併設した移動体が特定点近傍エリア内に帰還したと判断できることは言うまでもない。なお、UMS内蔵のプログラムで上記の逸脱/帰還の判定を実行するようにしても良くLANのトラフィックを低減できるメリットがある。

【0094】逸脱が検知された場合は監視センター又は/及び位置情報システムに通知すると共に必要があれば特定基準体に対し可聴的・可視的・機械的振動などの手段で通知する。また監視センターに位置情報算定を依頼したり、逸脱したPSの待受けモードを公衆/トランシーバ両待ちモードに変更したりする。

【0095】また態様6(手段6)で説明した事項を基準体端末内蔵コンピュータシステムに関する記述を除けば実施可能であるのは言うまでもない。

【0096】態様11(手段11):態様10において移動体が特定点近傍エリア逸脱時は、基準体監視サーバー自身が又は通知された監視センター又は位置情報システムは逸脱したPSの待受けモードを公衆/トランシーバ両待ちモードに変更し可聴的・可視的・機械的振動などの手段で基準体に警報を出し、位置情報システムの機能を利用して移動体位置の測位と追跡を開始する。移動体の位置と予め本発明の監視センター、ASP(Application Service Provider)、又は位置情報システム等に登録されている危険エリアを照合し危険度に応じて、より高いレベルの警報を発生したり、補足出動する。

【0097】なお図6は本発明の請求項3及び、同一発明者による特願2000-10569(位置探索・補足システムとその機器)を併せ実施した場合の具体的実施例における位置情報サーバー、監視センター、公衆PHS網、基準体端末(家庭用親機)、移動体端末、探索機間のコマンド/レスポンスや情報の遣り取りの概要を示す制御シーケンス参考例である。

【0098】

【発明の効果】以上に説明した様に本発明で特定点近傍エリアと言う概念を有しその逸脱判定を移動体端末または(及び)基準体端末における単に圏外のみでなくRSSI値の低下及びビットエラーレートの劣化でも行うの

で、正常活動範囲の精度を高め実用上適当な広さの範囲とすることができる。(課題2')

【0099】また、本発明の特定点とその逸脱判定は特開平11-027734のように自宅等の建屋内に特定点を限定し逸脱判定を公衆/家庭切替え時のRSSI値の比較では行わず、上記の手段で実行するので建屋内のみでなく屋外も正常活動域に含めることができる(課題2")

【0100】正常活動域登録は監視センターまたは/および基準体サーバーによりモニター画面に表示された地図上のエリアをポイント(プロット)すれば良くまた必要があれば移動体端末にはダウンロードするので正常活動域の登録が容易となる(課題2)。

【0101】また移動体端末に正常活動域に属する多数のCSIDを登録する必要はないので移動体端末の不揮発性メモリー領域を節約できる、このことはとりもなおさず正常活動域逸脱判定の比較演算が不要と言うことであり移動体端末内蔵コンピュータの処理が軽くなることを意味している(課題1)。

【0102】次に特定点近傍エリア逸脱判定は公衆PHS網に依存しないので公衆PHS網のセル特定誤差または位置算定誤差に基づく諸問題や判定遅延は生じない(課題3)。

【0103】移動体が特定点近傍エリア内にある場合の監視はPHS自営モード、トランシーバモードまたはRFIDタグにより実行するのでこの間の通信費や位置情報システム使用料は一切不要である(課題4)。

【0104】特定点近傍エリアを家屋内に限定せず庭や構内を含めることができ、また仮に特定点近傍エリアが狭くてもこのエリアを逸脱した場合に位置情報システムの位置算定に接続されて危険度や警報を出力できるので逸脱警報の頻出と狭所監禁による人権抑圧感を払拭できる(課題5)。

【図面の簡単な説明】

【図1】本発明の概念図

【図2】基準体の実施例を示すブロック図

【図3】手段7および手段8の概念図

【図4】合成した特定点近傍エリア構成例

【図5】建屋/門塀等で囲まれた特定点近傍エリア構成例

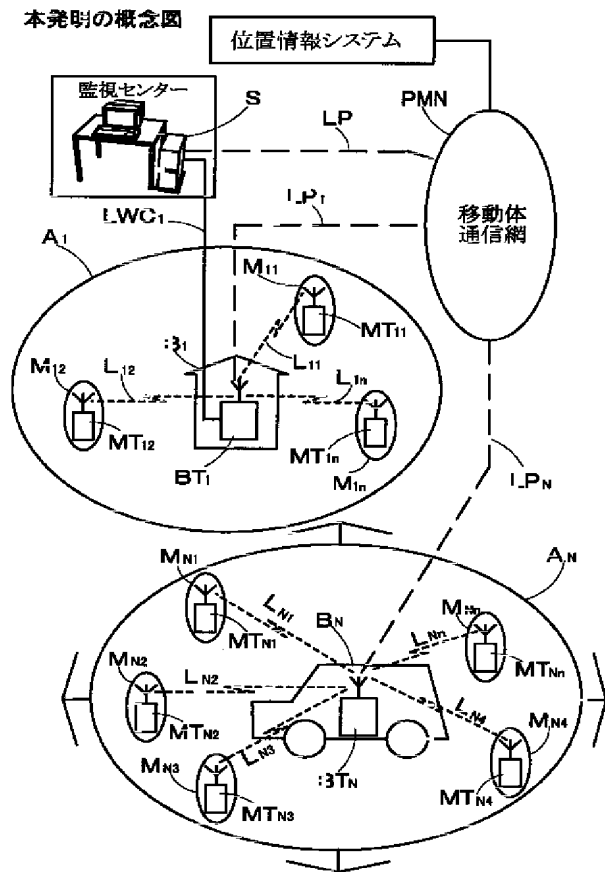
【図6】具体的実施例の制御シーケンス概要参考例

【符号の説明】

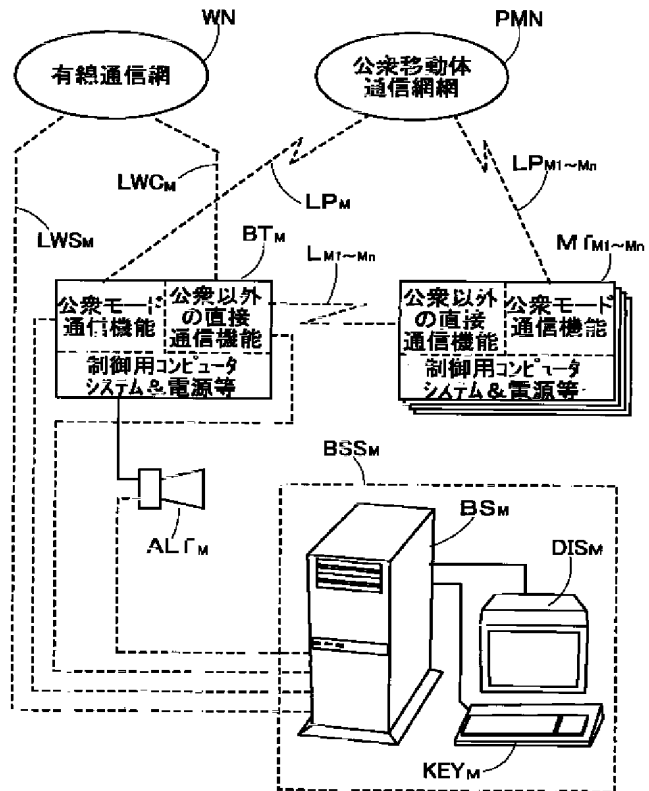
A <sub>1</sub> ~ A <sub>N</sub>	特定点近傍エリア
A' <sub>1</sub> ~ A' <sub>N</sub>	合成した特定点近傍エリア
ALT <sub>1</sub> ~ ALT <sub>N</sub>	警報装置
AT <sub>1 1</sub> ~ AT <sub>N n</sub>	能動型RFIDタグ
B <sub>1</sub> ~ B <sub>N</sub>	特定基準体
BS <sub>1</sub> ~ BS <sub>N</sub>	基準体サーバー
BSS <sub>1</sub> ~ BSS <sub>N</sub>	基準体サーバーシステム
BT <sub>1 1</sub> ~ BT <sub>N n</sub>	基準体端末

$DIS_M$	表示装置	$M_{11} \sim M_{Nn}$	特定点近傍エリアに活動する
$KEY_M$	キーボード/マウスなど	移動体	
$G_{M1} \sim G_{Mn}$	ゲート	$MT_{11} \sim MT_{Nn}$	$M_{11} \sim M_{Nn}$ に設けた移動
$LAN_{11} \sim LAN_{Nn}$	ローカルエリアネットワーク	体端末	
$L_{11} \sim L_{Nn}$	公衆以外の相互直接通信の無線リンク	$NC_1 \sim NC_N$	ネットワークインターフェースカード
LP及び $LP_1 \sim LP_N$	公衆移動体通信回線	NW	有線/無線と公衆/専用の任意組合による通信網
LX及び $LX_1 \sim LX_N$	公衆/専用/有線/無線など任意の通信回線	PMN	公衆移動体通信網
$LWC_1 \sim LWC_N$	固定的な基準体端末用有線通信回線	$PT_{11} \sim PT_{Nn}$	受動型RFIDタグ
$LWS_1 \sim LWS_N$	固定的な基準体サーバー用有線通信回線	$RT_1 \sim RT_N$	ルーター
		$RX_{11} \sim RX_{Nn}$	動型RFIDタグ用受信機
		WN	有線通信網

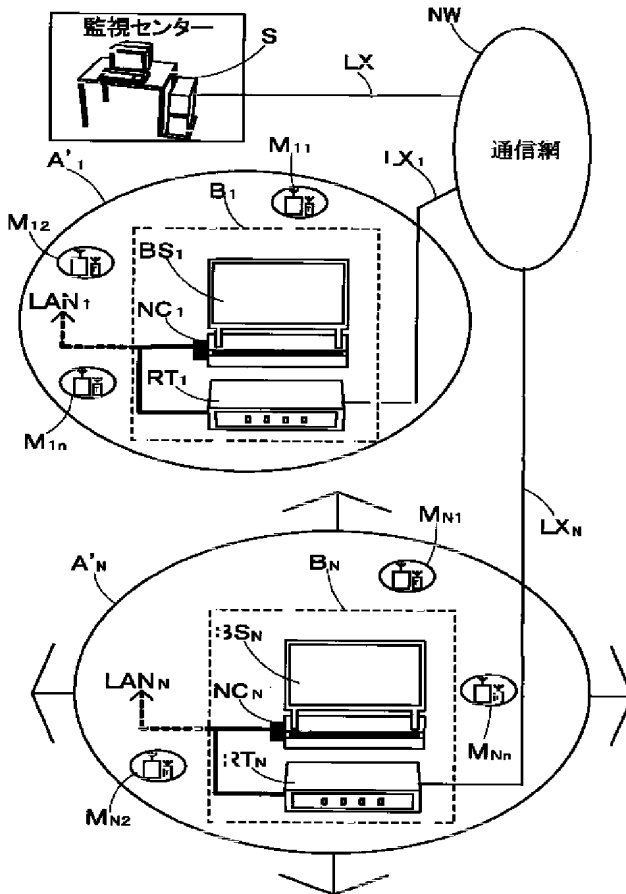
【図1】



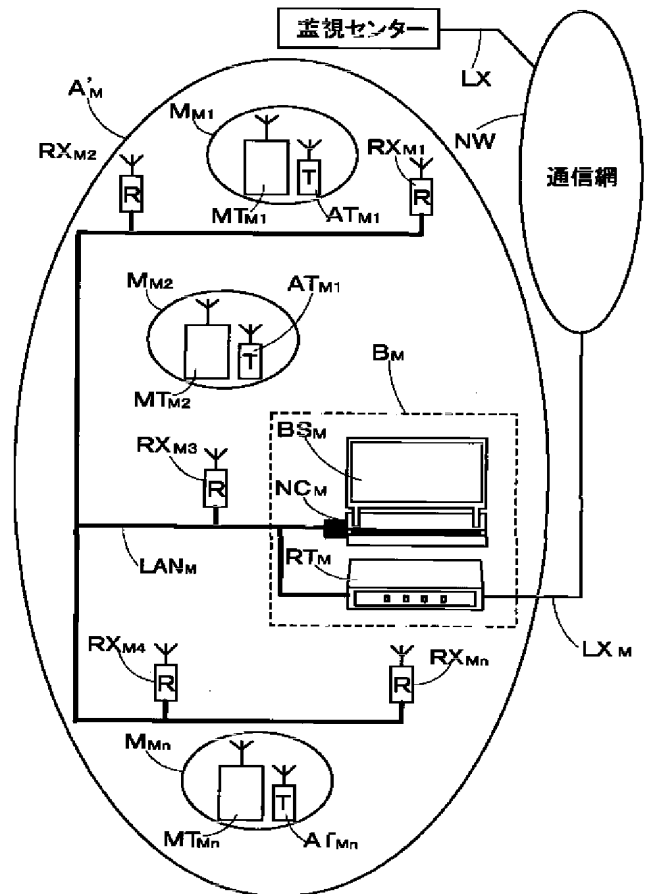
【図2】



【図3】

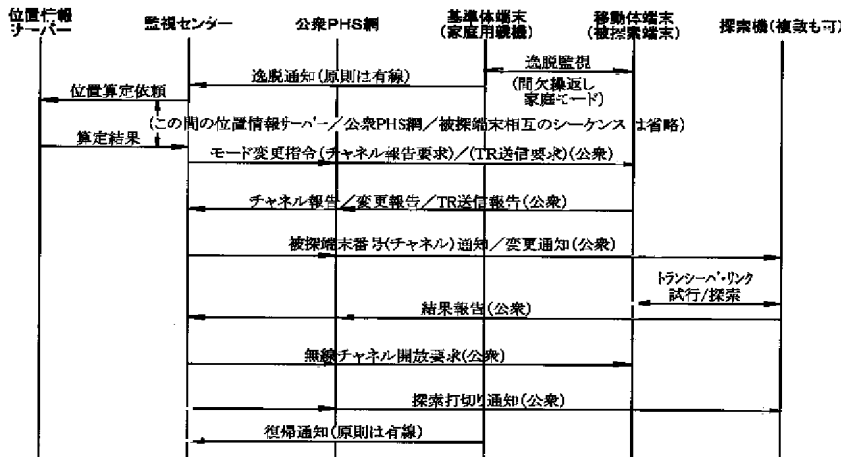


【図4】



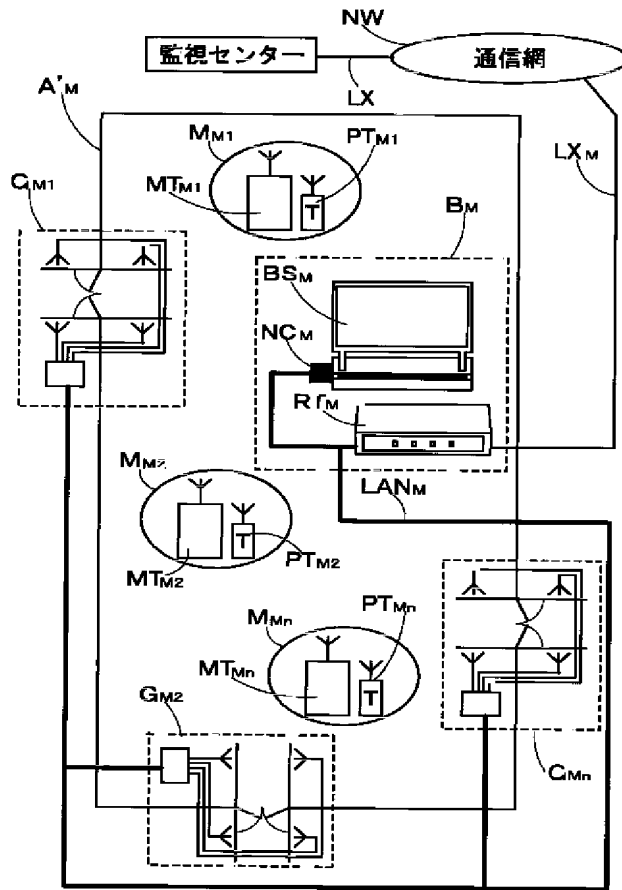
【図6】

図6 具体的実施例の制御シーケンス概要参考例



プロバイダー/探索機&被探端末間は公衆パケット(UPL-PHS)。結果通知で発見が報告されるが、親機から復帰通知を受信するまで位置算定以降を繰り返す。発見または復帰の場合は探索機及び被探端末に打ち切り通知を送る。

【図5】



フロントページの続き

(51)Int. Cl.<sup>7</sup>  
H04B 7/26

識別記号

F I  
H04B 7/26  
H04Q 7/04

(参考)

E  
106B  
C

Fターム(参考) 2F029 AA07 AB07 AC02  
5C087 AA03 AA09 AA23 AA32 AA41  
BB03 BB12 BB14 BB21 BB74  
DD05 DD13 DD23 DD24 DD29  
DD30 EE10 EE18 FF01 FF02  
FF13 FF17 FF19 FF20 FF23  
FF30 GG08 GG09 GG11 GG18  
GG21 GG23 GG30 GG36 GG40  
GG70  
5H180 AA21 BB04 BB05 FF05 FF27  
5K067 BB04 BB08 BB33 EE02 EE10  
EE16 EE25 FF16 FF17 FF22  
JJ51 JJ52 JJ53 JJ64

(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2002-222249  
(P2002-222249A)

(43) 公開日 平成14年8月9日(2002.8.9)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	テームト <sup>8</sup> (参考)
G 0 6 F 17/60	1 2 4 Z E C 3 0 2	C 0 6 F 17/60	1 2 4 Z E C 3 0 2 C 5 K 0 6 7
H 0 4 Q 7/34		H 0 4 B 7/26	1 0 6 B

審査請求 有 請求項の数12 O L (全 6 頁)

(21) 出願番号 特願2001-16481(P2001-16481)

(22) 出願日 平成13年1月25日(2001.1.25)

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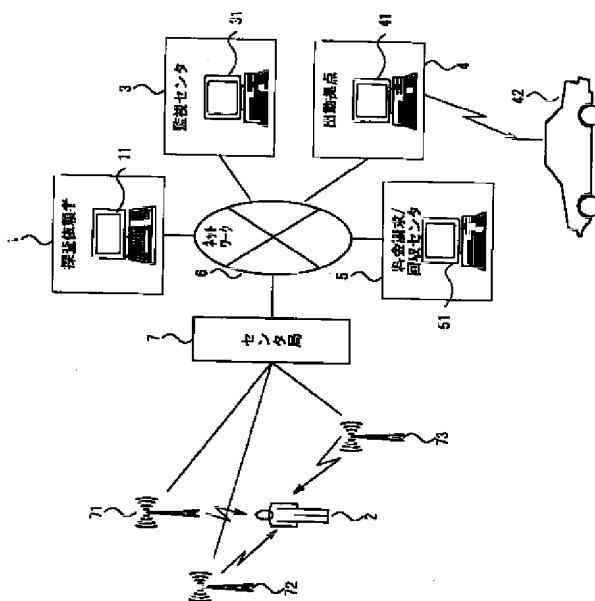
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(54) 【発明の名称】 移動体探査情報提供サービスシステム及び記録媒体

(57) 【要約】

【課題】 依頼者に対して移動体の位置情報等の提供サービス等を可能とする移動体探査情報提供サービスシステム及び記録媒体を提供する。

【解決手段】 監視センタ用コンピュータ31と、出動拠点用コンピュータ41と、料金請求/回収センタ用コンピュータ51と、からなり、そして、監視センタ用コンピュータ31、出動拠点用コンピュータ41及び料金請求/回収センタ用コンピュータ51は、ネットワーク6を介して接続して、情報の送受を行って、移動体2の探査情報の提供サービスを行うシステムであって、移動体2の探査依頼を受信する機能と、移動体2の位置情報を探査システムにより得て表示する機能と、出動拠点4に位置情報を転送する機能と、探査依頼者1に位置情報を送信する機能と、提供サービス料金を請求し回収する機能と、を有する。



【特許請求の範囲】

【請求項1】 監視センタ用コンピュータと、出動拠点用コンピュータと、料金請求/回収センタ用コンピュータと、からなり、そして、監視センタ用コンピュータ、出動拠点用コンピュータ及び料金請求/回収センタ用コンピュータは、ネットワークを介して接続して、情報の送受を行って、移動体の探査情報の提供サービスを行うシステムであって、

移動体の探査依頼を受信する機能と、移動体の位置情報を探査システムにより得て表示する機能と、出動拠点に位置情報を転送する機能と、探査依頼者に位置情報を送信する機能と、提供サービス料金を請求し回収する機能と、を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項2】 請求項1記載の移動体探査情報提供サービスシステムにおいて、探査依頼者との移動体探査契約の情報をデータベースに登録する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項3】 請求項2記載の移動体探査情報提供サービスシステムにおいて、移動体を識別するIDをデータベースに登録する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項4】 請求項1～3のいずれか1項に記載の移動体探査情報提供サービスシステムにおいて、探査依頼者のパスワードをデータベースに登録する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項5】 請求項4又は5に記載の移動体探査情報提供サービスシステムにおいて、探査依頼を受けたとき、移動体を識別するID又は探査依頼者のパスワードが登録内容と一致するか否かを確認する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項6】 請求項5記載の移動体探査情報提供サービスシステムにおいて、パスワードが一致した場合、被探査物体の位置情報を移動体探査システムで探査する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項7】 請求項6記載の移動体探査情報提供サービスシステムにおいて、移動体の位置情報を表示する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項8】 請求項1～7のいずれか1項に記載の移動体探査情報提供サービスシステムにおいて、移動体の位置情報により最寄の出動拠点を選択する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項9】 請求項8記載の移動体探査情報提供サー

ビスシステムにおいて、

移動体の探査情報を最寄の出動拠点に転送する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項10】 請求項1～9のいずれか1項に記載の移動体探査情報提供サービスシステムにおいて、移動体の探査情報を探査依頼者に転送する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項11】 請求項1～10のいずれか1項に記載の移動体探査情報提供サービスシステムにおいて、情報提供サービス料金を請求し、回収する機能を有することを特徴とする移動体探査情報提供サービスシステム。

【請求項12】 監視センタ用コンピュータと、出動拠点用コンピュータと、料金請求/回収センタ用コンピュータと、からなり、そして、監視センタ用コンピュータ、出動拠点用コンピュータ及び料金請求/回収センタ用コンピュータは、ネットワークを介して接続して、情報の送受を行って、移動体の探査情報の提供サービスを行うシステムに使用される記録媒体であって、移動体の探査依頼を受信する機能、移動体の位置情報を探査システムにより得て表示する機能、出動拠点に位置情報を転送する機能、探査依頼者に位置情報を送信する機能及び提供サービス料金を請求し回収する機能、をコンピュータに実行させるためのプログラムを記録したコンピュータ読取可能な記録媒体。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、移動体探査情報提供サービスシステム及び記録媒体であり、特に人、動物、物等の移動体についての探査情報の提供サービスを行うことができるシステムに関する。

【0002】

【従来の技術】最近、人、動物、物等の移動体について、探査して移動体の位置を見出すことができる探査システムが提案されており、これらの探査システムにより、移動体の位置を把握することは可能となった。しかしながら、移動体を探す人にとって移動体の位置情報等をすぐに得たいという要望があったが、従来、移動体の位置情報等を依頼者に提供するサービスシステムは、考慮されていなかった。

【0003】

【発明が解決しようとする課題】本発明は、従来の問題を解決するものであり、依頼者に対して移動体の位置情報等の探査情報の提供サービス等を可能とする移動体探査情報提供サービスシステム及び記録媒体を提供することを目的とする。

【0004】

【課題を解決するための手段】本発明は、監視センタ用

コンピュータと、出動拠点用コンピュータと、料金請求／回収センタ用コンピュータと、からなり、そして、監視センタ用コンピュータ、出動拠点用コンピュータ及び料金請求／回収センタ用コンピュータは、ネットワークを介して接続して、情報の送受を行って、移動体の探査情報の提供サービスを行うシステムであって、移動体の探査依頼を受信する機能と、移動体の位置情報を探査システムにより得て表示する機能と、出動拠点に位置情報を転送する機能と、探査依頼者に位置情報を送信する機能と、提供サービス料金を請求し回収する機能と、を有する移動体探査情報提供サービスシステムである。

【0005】また、本発明は、探査依頼者との移動体探査契約の情報をデータベースに登録する機能を有する移動体探査情報提供サービスシステムである。

【0006】そして、本発明は、移動体を識別するIDをデータベースに登録する機能を有する移動体探査情報提供サービスシステムである。

【0007】更に、本発明は、探査依頼者のパスワードをデータベースに登録する機能を有する移動体探査情報提供サービスシステムである。

【0008】また、本発明は、探査依頼を受けたとき、移動体を識別するID又は探査依頼者のパスワードが登録内容と一致するか否かを確認する機能を有する移動体探査情報提供サービスシステムである。

【0009】そして、本発明は、パスワードが一致した場合、被探査物体の位置情報を移動体探査システムで探査する機能を有する移動体探査情報提供サービスシステムである。

【0010】更に、本発明は、移動体の位置情報を表示する機能を有する移動体探査情報提供サービスシステムである。

【0011】また、本発明は、移動体の位置情報により最寄の出動拠点を選択する機能を有する移動体探査情報提供サービスシステムである。

【0012】そして、本発明は、移動体の探査情報を最寄の出動拠点に転送する機能を有する移動体探査情報提供サービスシステムである。

【0013】更に、本発明は、移動体の探査情報を探査依頼者に転送する機能を有する移動体探査情報提供サービスシステムである。

【0014】また、本発明は、情報提供サービス料金を請求し、回収する機能を有する移動体探査情報提供サービスシステムである。

【0015】そして、本発明は、監視センタ用コンピュータと、出動拠点用コンピュータと、料金請求／回収センタ用コンピュータと、からなり、そして、監視センタ用コンピュータ、出動拠点用コンピュータ及び料金請求／回収センタ用コンピュータは、ネットワークを介して接続して、情報の送受を行って、移動体の探査情報の提供サービスを行うシステムに使用される記録媒体であっ

て、移動体の探査依頼を受信する機能、移動体の位置情報を探査システムにより得て表示する機能、出動拠点に位置情報を転送する機能、探査依頼者に位置情報を送信する機能及び提供サービス料金を請求し回収する機能、をコンピュータに実行させるためのプログラムを記録したコンピュータ読取可能な記録媒体である。

【0016】

【発明の実施の形態】発明の実施の形態を説明する。本発明の移動体探査情報提供サービスシステムの実施例について、図1～図3を用いて説明する。図1は、実施例の移動体探査情報提供サービスシステムの説明図である。図2は、実施例における登録する手順の一例の説明図である。図3は、実施例における探査情報提供サービスの手順の一例の説明図である。

【0017】実施例を説明する。本実施例の移動体探査情報提供サービスシステムは、図1に示すように、監視センタ用コンピュータ31と、出動拠点用コンピュータ41と、料金請求／回収センタ用コンピュータ51と、からなり、移動体2の探査依頼を受信する機能と、移動体2の位置情報を探査システムにより得て表示する機能と、出動拠点4に位置情報を転送する機能と、探査依頼者1に位置情報を送信する機能と、提供サービス料金を請求し回収する機能と、を有する。また、探査依頼者1との移動体探査契約の情報をデータベースに登録する機能を有し、そして、移動体2を識別するIDをデータベースに登録する機能を有し、また、探査依頼者1のパスワードをデータベースに登録する機能を有している。そして、探査依頼を受けたとき、移動体2を識別するID又は探査依頼者1のパスワードが登録内容と一致するか否かを確認する機能を有している。パスワードが一致した場合、移動体2の位置情報を探査システムで探査する機能を有している。また、移動体2の位置情報を表示する機能を有している。そして、移動体2の位置情報により最寄の出動拠点4を選択する機能と、移動体2の探査情報を最寄の出動拠点4に転送する機能を有する。更に、移動体2の探査情報を探査依頼者1に転送する機能を有する。また、情報提供サービス料金を請求し、回収する機能を有する。

【0018】監視センタ用コンピュータ31、出動拠点用コンピュータ41及び料金請求／回収センタ用コンピュータ51は、WAN等のネットワーク6を介して接続しており、探査依頼者用コンピュータ11、携帯電話やPHS等のセンタ局7及び中継局71…と、情報を送受して、移動体2の探査情報を得たり、探査情報の提供サービスを行うことができる。探査依頼者1は、探査依頼者用コンピュータ11を使用して、監視センタ3に提供サービスを依頼することができる。センタ局7及び中継局71～73は、例えば三点方位方式により、携帯電話機等を所有又は保持する移動体2の位置を正確に把握することができる。



【0019】監視センタ用コンピュータ31は、サーバ等からなり、監視センタ3に設置されている。監視センタ3では、移動体探査システムを使用して移動体2の位置等の探査情報を得ることができ、そして、探査情報の提供サービスを行う。提供サービスを受ける者は、会員として契約する。会員は、移動体を識別するIDやパスワード等を受ける。ID及びパスワードは、監視センタ3に設置されたデータベースに登録される。会員ではない者は、仮登録することにより、会員と同等の提供サービスを受けることができる。

【0020】監視センタ用コンピュータ31は、探査依頼者用コンピュータ11から探査情報の提供サービスの依頼を受信する。探査情報の提供サービスを受ける会員が示したID及びパスワードがデータベースに登録されているか確認される。

【0021】監視センタ用コンピュータ31は、移動体探査システムにより該当する移動体の探査情報を得て、探査依頼者用コンピュータ11に送信する。また、移動体の探査情報により、移動体2が人であるとき、最寄の出動拠点4又は警察、消防、病院、救急医療等、を選択し、そして、その出動拠点用コンピュータ41に、移動体2の探査情報を転送するとともに、作業者出動の依頼等を行う。同様に、移動体2が動物又は物であるときは、契約会社又は輸送会社、警備会社へ探査情報を転送して、移動体2の確保等を依頼する。

【0022】出動拠点用コンピュータ41は、出動拠点4に設置されている。出動拠点4には、担当地区内に移動体2がいる又は有るとき、出動車両42を使用して駆け付ける担当者がいる。出動拠点用コンピュータ41は、ネットワーク6に接続されており、監視センタ用コンピュータ31から、移動体2の位置情報や出動依頼等を受信する。

【0023】料金請求/回収センタ用コンピュータ51は、料金請求/回収センタ5に設置されている。料金請求/回収センタ5は、提供情報サービス料金の請求や回収業務を行う。料金請求/回収センタ用コンピュータ51は、ネットワーク6に接続されており、請求した提供サービス料金を回収したとき、監視センタ用コンピュータ31に入金を受領した旨を通知する。

【0024】実施例の移動体探査情報提供サービスシステムにおける提供サービスの一例について、図2及び図3を使用して説明する。まず、登録する手順について、図2のフローチャートを用いて説明する。

S101) スタートする。

S102) 探査契約し、DBに登録する。

S103) 終了となる。

このようにして、移動体探査情報提供サービスにおける登録を行うことができる。

【0025】実施例における探査情報提供サービスの手順について、図3のフローチャートを用いて説明する。

S201) スタートする。

S202) 探査依頼する。

S203) 移動体のIDの情報を入力する。

S211) 契約DBに登録済みか判断し、登録済みであるとステップS231に進み、登録されていないとステップS221に進む。

S221) 仮登録して、ステップS203に戻る。

S231) 移動体の位置情報を入手する。

S232) 位置情報を画面表示する。

S241) 移動体が人間、動物、物であるか判断し、人間であるとステップS271に進み、動物であるとステップS251に進み、物であるとステップS261に進む。

S251) 契約会社に情報を転送し、ステップS281に進む。

S261) 輸送会社又は警備会社へ情報を転送し、ステップS281に進む。

S271) 最寄の出動拠点(警察、消防、病院、救急医療)へ位置情報を転送する。

S281) 探査依頼者に情報を通知する。

S282) 課金処理する。

S291) 終了となる。

このようにして、探査情報提供サービスを行うことができる。

【0026】なお、上記実施例では、移動体探査情報提供サービスシステムについて説明したが、移動体の探査依頼を受信する機能、移動体の位置情報を探査システムにより得て表示する機能、出動拠点に位置情報を転送する機能、探査依頼者に位置情報を送信する機能、提供サービス料金を請求し回収する機能、更に、必要により、探査依頼者との移動体探査契約の情報をデータベースに登録する機能、移動体を識別するIDをデータベースに登録する機能、探査依頼者のパスワードをデータベースに登録する機能、探査依頼を受けたとき、移動体を識別するID又は探査依頼者のパスワードが登録内容と一致するか否かを確認する機能、パスワードが一致した場合、被探査物体の位置情報を移動体探査システムで探査する機能、移動体の位置情報を表示する機能、移動体の位置情報により最寄の出動拠点を選択する機能、移動体の探査情報を最寄の出動拠点に転送する機能、移動体の探査情報を探査依頼者に転送する機能、情報提供サービス料金を請求し、回収する機能、をコンピュータに実行させるためのプログラムを、コンピュータ読取可能な記録媒体(例えば、CD-ROM等)に格納することは可能であり、そして、この記録媒体を使用することにより、パソコン等を監視センタ用コンピュータ31等として機能させることができる。

【0027】

【発明の効果】本発明によれば、依頼者に対して移動体の位置情報等の探査情報の提供サービス等を可能とする

移動体探査情報提供サービスシステムを得ることができる。

【図面の簡単な説明】

【図1】実施例の移動体探査情報提供サービスシステムの説明図。

【図2】実施例における登録する手順の一例の説明図。

【図3】実施例における探査情報提供サービスの手順の一例の説明図。

【符号の説明】

1 探査依頼者

11 探査依頼者用コンピュータ

2 移動体

3 監視センタ

31 監視センタ用コンピュータ

4 出動拠点

41 出動拠点用コンピュータ

42 出動車両

5 料金請求/回収センタ

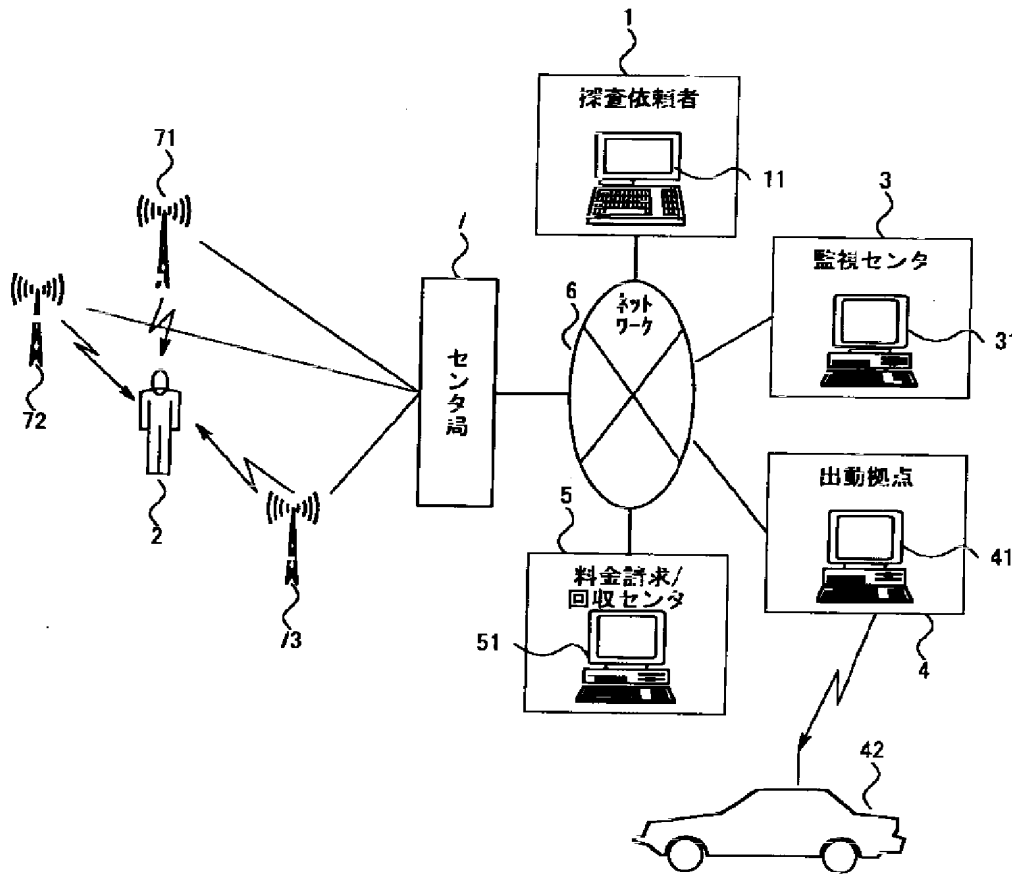
51 料金請求/回収センタ用コンピュータ

6 ネットワーク

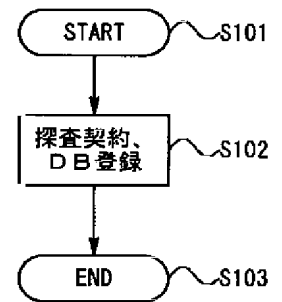
7 センタ局

71~73 中継局

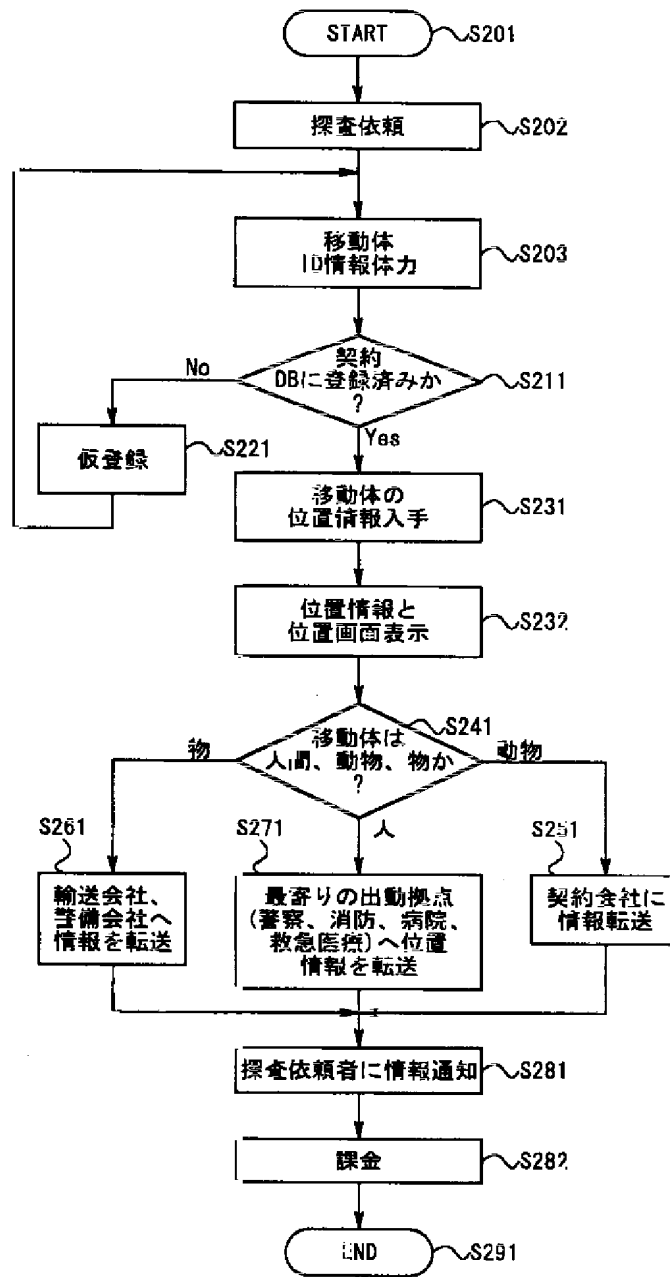
【図1】



【図2】



【図3】



フロントページの続き

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Fターム(参考) 5K067 AA21 DD44 EE02 EE10 EE16  
FF03 FF23 JJ53 JJ54 JJ64

(19) 日本国特許庁 (J P)

(12) 公表特許公報 (A)

(11) 特許出願公表番号  
特表2003-529083  
(P2003-529083A)

(43) 公表日 平成15年9月30日 (2003.9.30)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	テーマコード* (参考)
G 0 1 S 5/14		G 0 1 S 5/14	2 F 0 2 9
G 0 1 C 21/00		G 0 1 C 21/00	Z 5 H 1 8 0
G 0 8 G 1/0969		G 0 8 G 1/0969	5 J 0 6 2

審査請求 未請求 予備審査請求 有 (全 33 頁)

(21) 出願番号 特願2001-571128(P2001-571128)  
 (86) (22) 出願日 平成13年3月12日(2001.3.12)  
 (85) 翻訳文提出日 平成14年9月25日(2002.9.25)  
 (86) 国際出願番号 P C T / U S 0 1 / 0 7 9 4 2  
 (87) 国際公開番号 W O 0 1 / 0 7 3 4 6 6  
 (87) 国際公開日 平成13年10月4日(2001.10.4)  
 (31) 優先権主張番号 0 9 / 5 3 6 , 0 0 9  
 (32) 優先日 平成12年3月26日(2000.3.26)  
 (33) 優先権主張国 米国 ( U S )

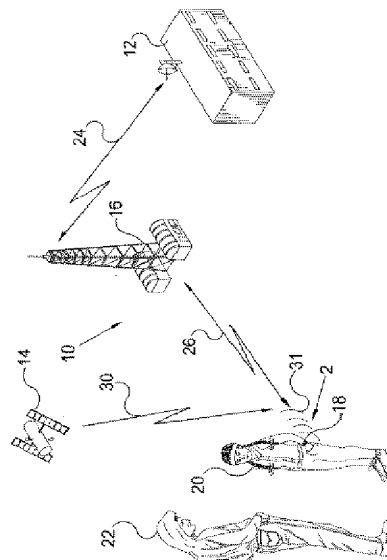
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 Fターム(参考) 2F029 AA07 AB07 AC02 AC14  
 5H180 AA21 BB04 BB05 BB08 BB15  
 CC11 CC12 FF05 FF13 FF22  
 FF25 FF27  
 5J062 AA13 BB05 CC07

最終頁に続く

(54) 【発明の名称】 個人位置検出システム

(57) 【要約】

ロケータ・ユニットの位置を突き止める個人ロケータシステム。このシステムは、中央ステーション (16) とGPS衛星 (14) との双方と交信するロケータ・ユニット (18) を有する。このロケータ・ユニットは、ユーザの腕の周りに装着可能なポータブル・ハウジングを有する。通信システムは、中央ステーションと交信するハウジング内に設けられ、かつ送信器と受信器を有する。GPSユニットも、このロケータ装置の位置を突き止めるためにGPSシステムと交信するハウジング内に設けられている。位置データの位置要求を受信すると、送信器が、分析のためにその位置データを中央ステーションに送信する。緊急信号 (26) を中央ステーションに送信し、ロケータ・ユニットの位置の検出を開始するため、パニックボタンが設けられている。非緊急コールボタンが、位置要求信号を中央ステーションに送信するために設けられていて、この中央ステーションに対する応答でこのロケータ装置の位置に関する交信リストを人 (22) に知らせる。この通信システムは、POTS、セルラー、PCS又は通信網のうちの1



【特許請求の範囲】

【請求項1】 a) ユーザの腕の周りに装着可能なポータブル・ハウジング  
;  
b) 中央ステーションとの無線通信を確立し、無線送信器及び無線受信器を有する手段;  
c) この無線受信器によってこの中央ステーションから位置要求信号を受取ると、ロケータ・ユニットが、GPSシステムと交信するためにこのロケータ・ユニットの位置を突き止める全地球測位衛星システムと交信する手段を起動させ、そこから位置データを計算し、この位置データ計算を完了すると、無線送信器は、分析のためにこの位置データを中央ステーションに送信するこの手段、及び、  
d) GPSユニットと通信送信器の電力を制御してバッテリーの寿命を最小限にする手段から構成される個人測位装置。

【請求項2】 個人測位装置は、中央ステーションに対して緊急信号を送信するパニックボタンをさらに有し、ユーザによる緊急状況を検出すると、中央ステーションは、この緊急信号の受取りに対する応答でこの個人測位装置に位置応答信号を転送する請求項1に記載の個人測位装置。

【請求項3】 個人測位装置は、ユーザによる起動の際に中央ステーションに対して位置要求信号を送信する非緊急コールボタンをさらに有し、中央ステーションは、非緊急信号の受取りに対する応答でこの個人測位装置に対して位置応答信号を転送する請求項2に記載の個人測位装置。

【請求項4】 中央ステーションは、各個人測位装置に対して交信リストを記憶し、ユーザによる非緊急コールボタンの起動に対する応答で位置データを受取ると、この中央ステーションは、ロケータ装置の位置に関する交信リストを人に知らせる請求項3に記載の個人測位装置。

【請求項5】 確立手段は、POTS、セルラー、PCS又はインターネット通信網を利用する請求項1に記載の個人測位装置。

【請求項6】 個人測位装置は、この個人測位装置がいつ干渉されたかを検出するタンパー検出センサをさらに有し、送信器を起動して、緊急信号を中央ス

ーションに送信する請求項 5 に記載の個人測位装置。

【請求項 7】 個人測位装置は、この個人測位装置の位置を正確に示すときに人を援助する超音波ビーコン信号を発生するビーコン発生器をさらに有する請求項 1 に記載の個人測位装置。

【請求項 8】 ビーコン発生器は、無線周波数のビーコン信号を発生する請求項 7 に記載の個人測位装置。

【請求項 9】 個人測位装置は、ユーザの腕の周りの装置をラッチする電気的なキー又は機械的なキーをさらに有する請求項 1 に記載の個人測位装置。

【請求項 10】 個人測位装置は、ユーザの腕の周りのこの個人測位装置をラッチングするために中央ステーションから受信したラッチング命令によって起動されるラッチング機構をさらに有する請求項 9 に記載の個人測位装置。

【請求項 11】 個人測位装置は、P C S タワーに対するクロック位相ロックと電圧制御発振器をさらに有し、この電圧制御発振器は、この P C S タワーを追跡するクロック位相ロックループからの電圧情報を利用する請求項 1 に記載の個人測位装置。

【請求項 12】 個人測位装置は、中央ステーションを介して別の部隊に送信するためにユーザからオーディオ信号を受信するマイクロフォンを有し、かつ中央ステーションを介して別の部隊からの受信器によって受信したオーディオ信号を再生するスピーカを有する請求項 1 に記載の個人測位装置。

【請求項 13】 a) ロケータ ユニットの追跡されるべき物体又は人に装着し；

b) 加入者からの位置要求を受取ると、信号を制御ステーションからロケータ ユニットの位置を要求しているこのロケータ ユニットに送信し；

c) G P S 衛星信号を受信するためにこのロケータ ユニットに接続された G P S ユニットを起動させ、

d) P C S タワーのクロックを追跡するクロック位相ロックループからの電圧情報を使用することによって時間を低減するために G P S 信号の獲得を援助し；

e) G P S 信号からの位置データを計算し；

f) 分析してロケータ ユニットの位置を突き止めるために位置データを中央

ユニットへ送信し；

g) 加入者にロケータ ユニットの位置を知らせることから成る人又は物体の位置を突き止める方法。

【請求項 1 4】 方法は、近い範囲のときにロケータ ユニットの位置を突き止める加入者を援助するためにこのロケータ ユニットによってビーコンを発生するステップを有する請求項 1 3 に記載の方法。

【請求項 1 5】 装着ステップは、電子キーを使用すること、器械キーを使用すること、又は中央ステーションから遠隔信号を受信して、ラッチング機構をラッチすることのうちの 1 つを有する請求項 1 3 に記載の方法。

【請求項 1 6】 方法は、ロケータ ユニットの起動して、中央ステーションと交信し、そしてこのロケータ ユニット上の非緊急コールボタンを起動したときに、位置要求信号の発生を開始するステップをさらに有する請求項 1 3 に記載の方法。

【請求項 1 7】 方法は、ロケータ ユニットから位置データを受取るときに中央ステーションによって記憶された交信リスト上で身元確認された人と交信するステップをさらに有する請求項 1 6 に記載の方法。

【請求項 1 8】 方法は、ロケータ ユニットの起動して、中央ステーションと交信し、そしてこのロケータ ユニット上のパニックボタンを起動したときに、位置要求信号の発生を開始するステップをさらに有する請求項 1 3 に記載の方法。

【請求項 1 9】 方法は、エアモード ボタンが起動すると、ロケータ ユニットの操作を一時停止するステップをさらに有する請求項 1 3 に記載の方法。

【請求項 2 0】 エアモードボタンが起動すると、ロケータ ユニットの操作が所定の期間一時停止される請求項 1 9 に記載の方法。

【請求項 2 1】 方法は、中央ステーションによってロケータ ユニットの電力レベルを監視するステップをさらに有する請求項 1 3 に記載の方法。

【発明の詳細な説明】

【0001】

本発明は、全地球測位衛星（GPS）システムや、ロケータ ユニットすなわちユーザの位置を正確に示すために使用するビーコンの発生を含む多数の位置確認技術を使用する位置確認システム、特にポータブル ロケータ ユニットの所持するユーザの所在地を突き止めて追跡可能なシステムに関する。

【0002】

本発明は、ロケータ ユニットの位置を突き止めるパーソナル ロケータシステムを有する。このシステムは、中央ステーションとGPS衛星の双方と交信するロケータ装置を有する。このロケータユニットは、ユーザの腕の周りに装着可能なポータブルハウジングを有する。通信システムが、中央ステーションと交信するためにこのハウジング内に設置されていて、かつ送信器と受信器を有する。GPSユニットも、ロケータ装置の位置を突き止めるGPSシステムと交信するためにハウジング内に設置されている。受信器が中央ステーションから位置要求信号を受取ると、ロケータ ユニットが、GPSユニットを起動してGPSシステムと交信し、このGPSシステムから位置データを算定する。位置データの計算を完了すると、ロケータは、分析のために位置データを中央ステーションに送信する。パニックボタンが、緊急信号を中央ステーションに送信して、ロケータ ユニットの位置を検出するために設けられている。非緊急コールボタンが、位置要求信号を中央ステーションに送信し、それに対して応答し、ロケータ装置の位置に関する交信リストを人に知らせる。通信システムが、POTS、セルラー、PCS又はインターネット通信網のうちの1つを利用する。タンパー検出装置は、ロケータ装置がいつ干渉(tamper)されるか検出する。ビーコン発生器が、ロケータ装置の位置を正確に示す際に人を助ける超音波又は無線周波数のビーコン信号を発生する。

【0003】

以下に、本発明のその他の構成、特徴及び付随する利点を図面に基づいて説明する。同じ又は類似の部分を経つかの図面にわたって符号で示す。

【0004】



図面について説明する。これらの図面の類似の符号は、類似の要素を示す。図1～6は、符号10によって示された本発明の全地球測位追跡システムを示す。

【0005】

全地球測位追跡システム10は、図1中に示されている。この全地球測位追跡システム10は、中央監視ステーション12、追跡衛星14、局地中継ステーション16及びポータブル・ロケータ・ユニット18を有する。ポータブル・ロケータ・ユニット18と交信するか、又はポータブル・ロケータ・ユニット18によって生成された信号を受信した際に、中央監視ステーション12は、起動されたポータブル・ロケータ・ユニット18の移動を監視することができる。

【0006】

ポータブル・ロケータ・ユニット18は、耐干渉性で検出可能なポータブル・ユニットである。このポータブル・ロケータ・ユニット18は、個人の所有物か又は図1中に示されたように子供のような個人に取外し可能に装着されている。図中の子供20は、保護者22によって監視されている。中央監視ステーション12は、POTS、セルラー、PCS又はインターネットのような公共通信ネットワークを介してポータブル・ロケータ・ユニット18と交信する。システム10の主な目的は、ポータブル・ロケータ・ユニット18を携帯している人20の位置を突き止める進歩的により正確な技術を使用して、装着者の位置を突き止めることである。これらの技術は、無線基地ステーションID測位技術に関連する。この技術は、通信媒体としての無線インターネットを使用する全地球測位(GPS)システムに対して1～10平方マイルの範囲内の位置にあるロケータ・ユニット18の位置を突き止めることができる。このシステムは、約5メートル内にいるポータブル・ロケータ・ユニット18の装着者の位置を突き止めることができる。ポータブル・ロケータ・ユニット18によって生成される音波の周波数又は無線周波数のビーコンが、所望の人又は物体に対する最後の接近を容易にする。

【0007】

本発明のシステム10は、ページング機能を含む優れた測位サービスを提供す

るためにSMS/QNCセッションのようなクライアント・サーバプロトコルを備える。ポータブル・ロケータ・ユニット18を装着している中央ステーション12が、図2中のパニックボタン42を押すことによって緊急コールを中央ステーション12に対して送ることができる。タンパー検出センサが、後で説明するようにポータブル・ロケータ・ユニット18との干渉(tampering)の検出時に緊急コールを自動的に起動できる。非緊急コールも、図2中の非緊急コールの作動時に装着者によって起動され得る。中央ステーション12は、交信リスト上の所望の保護者にユーザの行方に関して知らせる。操作のブレード・クランプリング・モードが、バッテリー出力に制限のあるロケータ・ユニットの効果的で柔軟性のある追跡を可能にする。ロック機構、アンロック機構及びロケータ・ユニット操作の中断(例えば、飛行機の旅行)が、最大の安全性と有用性を提供する無線ネットワークを介して権利のあるキー・フォップ又は中央ステーション12によって制御される。これらのタスクを実行するシステムの操作は、後で説明する。

#### 【0008】

操作のノーマルモードでは、GPS衛星14と交信するポータブル・ロケータ・ユニット18のGPSユニットが通常オフになっている。そして、中央ステーション12と交信するシステムが、セルラー/PCS電話システムのリスニングモードと類似のリスニングモードにセットされている。中央ステーション12が特定のポータブル・ロケータ・ユニット18上の位置を要求する顧客からのコールを受信したときに、中央ステーション12は、ポータブル・ロケータ・ユニット18との交信を開始する。中央ステーション12は、送信/受信ステーション16を介し無線通信チャネルを使用してポータブル・ロケータ・ユニット18と交信する。これらの送信/受信ステーション16は、信号をポータブル・ロケータ・ユニット18に中継する。送信/受信ステーション16に対して中央ステーション12によって送信される信号は、矢印24によって示されている。ポータブル・ロケータ・ユニット18に対して送信/受信ステーション16によって送信される信号は、矢印26によって示されている。中央ステーション12は、この通信チャネルを通じて中央ステーション12に位置情報を送り返

すやり方に関する指示を提供する。中央ステーション12から受信される指示は、位置情報をより迅速に得るためのGPSユニットを使用する援助情報を含み得る。中央ステーション12から指示を受取ると、追跡装置18が、中央ステーション12との交信を終了し、その時点でGPSユニットをオンにする。GPSユニットは、中央ステーション12からの(時間、周波数及び暦表時のような)援助情報によって又は援助情報なしで位置データを計算する。この時、ポータブル・ロケータ・ユニット18は、中央ステーション12との無線通信リンクを確立し、矢印26, 24によって示されたように位置情報を中央ステーション12に対して送信する。ポータブル・ロケータ・ユニット18は、アーチ状の線31によって示されたビーコンも発生する。このビーコンは、音波又は無線周波数の信号である。このビーコンは、近い範囲になったときにユーザの位置を突き止める助けをする。

#### 【0009】

ポータブル・ロケータ・ユニット18の典型的な実施の形態が、図2, 3中に示されている。ポータブル・ロケータ・ユニット18は、一般にはブレスレット又は腕時計のようにユーザによって腕32の周りに装着される。ポータブル・ロケータ・ユニット18は、好ましくは切断不可能な材料から作られる。その結果、適切な解除機構なしで取外すことは困難であるか又は不可能でさえある。したがって、ポータブル・ロケータ・ユニット18は、心配なしに子供、又は囚人若しくは釈放プログラム若しくは猶予中の被收容者、又は医療介護の必要な高齢者、個人の財産、又はハイカー若しくは危険なエリアにわたって移動する登山家のような運動家を追跡するために使用され得る。ポータブル・ロケータ・ユニット18は、顔面38上に滑らかな構造の外面34とディスプレイ36を有する。ディスプレイ36は、一日の時間を示す時計40を有する。ポータブル・ロケータ・ユニット18は、表示される内部時計を有する。この時間は、ロケータ・ユニット18内のPCSユニットがPCSタワーで登録する時にセットされる。ロケータ・ユニットは、装着している領域内の正確な時間を自動的に表示する。この時間は、非常に正確であり世界時間の1秒以内であるものの、ロケータ・ユニットのGPS部に対しては十分正確でない。ポータブル・ロケ

ーター・ユニット18がユーザの腕32の周りでロック状態にあるか否かを示す指示41も、ディスプレイ36上に設けられている。後で説明するように、ロケーターユニット18がエアモードのときのように、追加の指示をロケーター・ユニット18の操作のモードを示すために表示してもよい。緊急ボタン42が、ポータブル・ロケーター・ユニット18上に設けられている。緊急ボタン42の起動が、中央ステーション12との交信を開始する。この場合、緊急事態の存在を示す信号が、ポータブル・ロケーター・ユニット18によって送信される。この緊急信号の受取りに対する応答で、中央ステーション12がポータブル・ロケーター・ユニット18の位置を突き止める処理を開始する。その位置が測定されると、適切な緊急人員が召集される。非緊急位置ボタン44も、ポータブル・ロケーター・ユニット18の顔面40上に設けられている。非緊急位置ボタン44の起動が、ポータブル・ロケーター・ユニット18の位置を突き止める中央ステーション12と交信させる。ポータブル・ロケーター・ユニット18の位置が突き止められると、中央ステーション12が、ポータブル・ロケーター・ユニット18の位置を所定の部隊に知らせるためにその部隊と交信する。エアモードボタン46も、ポータブル・ロケーター・ユニット18上に設けられている。エアモードボタン46は、所定の周期に対して追跡装置18をオフにする。飛行機内のように、セルラー技術の使用が禁止されているエリアに侵入しているときに、このモードは有益である。

#### 【0010】

ポータブル・ロケーター・ユニット18の側面が、図3中に示されている。この図では、ラッチング機構48が、ロックボタン50、キー・フォップ用のポート51及びヘッドフォンを受けるポート52と共に示されている。ポータブル・ロケーター・ユニット18は、ラッチング機構48をラッチすることによって、及びキー・フォップ上のロックボタン50を押してポータブル・ロケーター・ユニット18をロックするためにキー・フォップを接続することによって保護(ロック)されている。ポータブル・ロケーター・ユニット18は、中央ステーション12からの命令によってロックされてもよい。キー・フォップ上のロック/アンロックボタンは、ポータブル・ロケーター・ユニット18に対する1E22個

の異なるキーコードのうちの1つのキーコードをアップロードすることによって、このキーコードをデッドボルトのラッチのために教えることによって電子機構装置を起動させる。このデッドボルトは、ポータブル・ロケータ・ユニット18がアンラッチされたり又は取外されたりするのを阻止する。ロックがボタン50又はキー・フォップを通じて起動されると、ロックアイコン41が、ディスプレイ36上に現れる。ポータブル・ロケータ・ユニット18が中央ステーション12と交信している時は、ロック／アンロック状態を示すデータが、データパッケージ内に含まれている。ポータブル・ロケータ・ユニット18は、ラッチング機構48だけをラッチすることによって、そしてロックプロセスを省略することによってユーザに対して（ロックされないで）装着されてもよい。ラッチが一度ロックされると、このロックは、権利のあるキー・フォップによってしか解除できない。ポータブル・ロケータ・ユニット18が解除されると、ロックアイコンがディスプレイ36から消滅し、ポータブル・ロケータ・ユニット18を解除して取外することができる。ポータブル・ロケータ・ユニット18のバッテリー消費を最小限にするため、好適な実施の形態は、ポータブル・ロケータ・ユニット18と中央ステーション12との間の通信用のIS95B PCSを利用する。典型的なロッキング機構48は、図3中に示されている。しかしながら、ロッキング機構48が、一度装着されたポータブル・ロケータ・ユニット18を物品又は人から外されるのを阻止するならば、ロッキング機構38は、キー、組合わせロック、電子キー等のような各種の可能なロッキング機構で設けてもよい。

#### 【0011】

ロケータユニット18の内部要素を示すブロック図が、図4中に示されている。プロセッサ54が、ロケータ・ユニット18内に設けられていてこれらの内部要素を制御する。内部電源56が、プロセッサ54に接続されていて、ロケータユニット18に電力を供給する。バッテリー・センサ58が、プロセッサ54と電源56との間に接続されている。バッテリーセンサ58は、電源の出力を検知し、バッテリー出力信号をプロセッサ54に供給する。したがって、プロセッサ54は、出力レベルがいつ低いかを確認することができ、それに応じて作

動可能である。プロセッサ54によって処理されたデータ、及びロケータ・ユニット18を操作するプロセッサ54によって使用されたプログラムを記憶するため、記憶器60が設けられている。受信器62が、中央ステーション12から無線送信された信号を受信するためにも受けられている。送信器64が、中央ステーション12に信号を送信するために設けられている。受信器62と送信器64の双方が、プロセッサ54に接続されていて、プロセッサ54によって制御される。中央ステーション12を通じてもう1つの部隊と音声で交信するため、マイクロフォン66とスピーカ68も設けられている。その代わりに、マイクロフォンとスピーカをヘッドフォン・ポート52を通じてロケータ・ユニット18に接続されたヘッドフォン内に含めてもよい。マイクロフォン66は、ユーザからの音声通信を受信することができ、かつ送信器を使用して中央ステーション12経由でその他の部隊にオーディオ信号を送信することができる。受信器62は、スピーカ68を通じて再生するために中央ステーション12からのオーディオ信号を受信することができる。

#### 【0012】

GPS受信器が、GPS衛星14と交信してロケータ・ユニット18の位置を突き止めるために設けられている。位置情報が、プロセッサ54に送信され、最終的には中央ステーション12に送信される。近い範囲のときに、ビーコン発生装置72が、ユーザの位置を突き止める助けをする音波又は無線周波数のビーコンを発生する。状況が救出又はその他の理由のために物理的な接触を要求するときは、ビーコン発生器72は、装着者に最終的に接近することを可能にする。一般に、GPSシステムは、建造物や視覚的に妨害のあるエリア内の装着者の位置を正確に示す十分な分解能を有しない。ビーコン72は、音波又は無線周波数の装置を使用する最後の接近を成し遂げる手段を提供する。キー・フォップ74は、ユーザの腕の周りのロケータ・ユニット18を保護する追加の手段を提供する。キー・フォップは、ロケータ・ユニット18内のバッテリーを充電する機構も提供する。タンパー・センサ76は、ロケータ・ユニット18がいつ干渉されるか又はカットされるかを検出し、その信号をプロセッサ54に送る。そして、プロセッサ54は、中央ステーション12に送信される緊急信号を発生す

る。中央ステーション 12 は、ロケータ・ユニット 18 の位置を確認するためにこのロケータ・ユニット 18 との交信を開始する。パニックボタン 42 及び非緊急セルボタン 44 が、起動時に中央ステーションと交信を開始するためにプロセッサ 54 に接続されている。ディスプレイ 36 も、プロセッサ 54 に接続されている。プロセッサ 54 は、ディスプレイ 36 上で目視可能なアイコンと時計を制御する。

#### 【 0013 】

以下に、個人位置検出システム 10 の操作を図、特に図 5, 6 を参照して説明する。個人位置検出システム 10 は、操作中に人又は物体の位置を突き止めるために使用される。ロケータ・ユニット 18 は、この人又は物体に対して保護されている。図 6 は、ロケータシステム 10 に基づく P C S ネットワークの例を示す。ロケータ・ユニット 18 は、GPS ユニット 70, P C S 通信システム 62, 64 及びプロセッサ 54 を有する。通信ステーション 86 は、その中に通信システム 62, 64 の受信器によって受信される信号を分析するプロセッサを有する。子供が行方不明になった場合、加入者 78、一般に保護者が、一般の電話 ( P S T N ) , 無線電話 80 又はインターネット接続 82 を通じて位置を突き止める処理を開始する。中央ステーション 12 のオペレータが、要求を受信して、ロケータ・ユニット 18 とのコール・セットアップを開始する。ユーザ 20 は、パニックボタン 42 又は非緊急コールボタン 44 を押すことによってコール・セットアップも開始できる。この例では、ロケータ・ユニット 18 が中央ステーション 12 と交信し、加入者 78 が中央ステーション 12 と交信するときと同様に、システムが作動する。

#### 【 0014 】

通信システム 62, 64 が、バッテリーとタンパー検出状況に限定されないシステムの保全性を連続して監視する。通信システム 62, 64 は、制御ステーション 12 からの要求の受信時に制御ステーション 12 に対するサーバとして作動し、通信リンクをセットアップする。制御ステーション 12 からの要求は、公共サービス電話通信網 ( P S T N ) 又はセルラー 80 を通過し、通信システム 86 によって分析するためにロケータ・ユニット 18 の通信システム 62, 64 の受

信器によって受信される。そして、ロケータ・ユニット 18 は、要求に対して応答し、通信システム 62, 64 の送信器を通じて応答信号を送信する。好適な実施の形態では、SMS インターネット (TCP/IP) セッションが、最大の相互通用性に対して使用される。イベント・カウンターが通信システム 62, 64 をトリガーして、完全デュプレックス通信リンクをセットアップするときは、通信システム 62, 64 は、制御ステーション 12 に対する顧客としても作する。本発明の好適な実施の形態では、QNC セッションに基づく TCP/IP は、中央ステーション 12 とロケータ・ユニット 18 との間のデュプレックス通信に使用される。通信システム 62, 64 は、ロック/アンロックとバッテリー充電操作を保証するために外部装置キー・フォップ 74 とインターフェースで接続されている。

#### 【0015】

GPS ユニット 70 は、GPS 衛星 14 からの信号を利用する測位操作を実行する。一般に GPS ユニット 70 は、中央ステーション 12 からの命令の応答時又はパニックボタン 42 若しくは非緊急コールボタン 44 の起動時にオフモードになっている。プロセッサ 54 が起動すると、GPS ユニット 70 がオンになって、測位処理を開始する。GPS ユニット 70 は、効率性を向上するために中央ステーション 12 からの援助情報を利用できる。このような援助情報は、ロケータ・ユニット 18 の大まかな位置のほかに暦、暦表時、周波数オフセット、ドップラー、基準時間等を含む。GPS ユニット 70 は、GPS 衛星 14 使用して計算した位置データをプロセッサ 54 に送る。プロセッサ 54 は、中央ステーション 12 に対する呼出しを開始して、その位置データを分析のために中央ステーション 12 に送信する。そして、中央ステーション 12 は、適切なエリア内でロケータ・ユニットの位置を突き止めることができる。そして、音波又は無線周波数信号の発生が必要なときは、プロセッサ 54 は、ビーコン発生器 72 を起動する。GPS 又は無線通信リンクが悪い環境のために確立できないエリア内でも、この音波又は無線周波数信号は、所望の物体への最後の接近を可能にする。

#### 【0016】

図 5 は、ロケータ・ユニット 18 の位置を突き止めるシステムの異なる操作



モードを示す状態図を示す。最初、ロケータ・ユニット 18 は、ワッチモードにある。ロケータ・ユニット 18 は、このワッチモードの間に中央ステーション 12 から来る信号を監視する。パニックボタン 42 又は非緊急コールボタン 44 の起動に対する応答中に加入者から又はロケータ・ユニット 18 から信号を受取ると、中央ステーション 12 は、SMS ( Short Message Service ) メッセージをロケータ・ユニット 18 に送る。このロケータ・ユニット 18 は、このロケータ・ユニット 18 が中央ステーション 12 と交信するのを要求する。そして、ロケータ・ユニット 18 は、中央ステーション 12 に接続している QNC ( Quick Net Connect ) インターネット・セッションを開始する。この時、ロケータ・ユニット 18 は、エアモードに入る。このエアモードでは、中央ステーション 12 は、ロケータ・ユニット 18 がその位置を確認することを要求する。ロケータ・ユニット 18 が中央ステーション 12 に接続されている間に、衛星 14 の位置を突き止める際に GPS 装置 70 を援助する要求信号が、ロケータ・ユニット 18 にアップロードされる。ロケータ装置 18 は、GPS 衛星 14 から直接要求情報を得る能力も有しているが、これは最後の代替手段としてだけ使用される。ロケータ・ユニット 18 自身が、中央ステーション 12 から遮断して、このロケータ・ユニットの位置を得る処理を開始する。いつもオフになっている GPS 70 がオンし、GPS 70 を PCS タワー 86 に対して位相同期しつつ、正確な時間が、PCS タワー 86 からロケータ・ユニット 18 に送信される。PLL が PCS タワーと同期状態でないときでも、位相同期ループ ( PLL ) における VCO ( voltage controlled oscillator ) の電圧情報が、GPS 用の援助情報として使用される。このとき、通信システムから GPS ユニット 70 に送られる全ての援助情報が入手可能である。したがって、ロケータ・ユニット 18 は、その援助情報をこのロケータ・ユニット 18 の測位のために使用できる。GPS ユニット 70 がロケータ・ユニット 18 の位置を確認した後に、位置情報は、プロセッサ 54 に送られて、GPS ユニット 70 が遮断する。PCS プロセッサは、もう 1 つの QNC インターネット・セッションを開始する。中央ステーション 12 が、この通信の間にロケータ・ユニット 18 から全ての位置情報をダウンロードして、このセッションを終了する。このとき、

中央ステーション 12 は、ロケーター・ユニット 18 の位置を知り、インターネット又は通常の通信組織を通じてこのデータを平均的な顧客が理解できる座標情報に変換することができる。そして、ロケーター・ユニット 18 は、中央ステーション 12 からの次の信号を待つワッチモードに戻る。中央ステーション 12 は、ロケーター・ユニット 18 から受信した位置データを使用し、この位置データを境界標識を有する地理データに変換する。この地理データは、電話で加入者に配信されるか又はインターネットのユーザ用のマップ上に表示され得る。

【 0017 】

ロケーター・ユニット 18 は、装着者が緊急位置セッションを開始可能にプログラミングされ得る。ユーザが緊急行動を示すパニックボタン 42 を起動すると、ロケーター・ユニット 18 が中央ステーション 12 と交信する。パニック（警報）ボタン 42 は、状態をワッチモードからエアモードに移させる。そして、インターネット・セッションが確立される。中央ステーション 12 は、この緊急交信を記録し、上述したように測位処理を開始する。中央ステーション 12 からの最初のメッセージは、ベースステーション ID 情報を含む。この情報は、最後の位置情報が受信されたときに、適切な P S A R（Public Service Answering Point）のうちどの P S A R が緊急セッションに拘束されるかを示すために使用される。そして、エアタイムモードが、上述したように進行する。

【 0018 】

非緊急状況コールが、非緊急コールボタン 44 の起動時にユーザによって起動されてもよい。この処理は、パニックボタン 42 が起動されるときと同様に実行される。非緊急コールボタン 44 が起動されると、中央ステーション 12 がこの非緊急状況情報を優先した交信リスト中の交信人に送る。このリストは、サービスの登録の際に好ましくは中央ステーション 12 に供給され、P S A T 9 1 1 緊急コールセンターなしに保護者との交信を可能にする。

【 0019 】

ページャー (pager) モードも、図 5 中に示されている。ロケーター・ユニット 18 は、加入者が選択した場合に、ページャーとしてディスプレイ 36 上に S M S メッセージを表示するオプションの機能を有する。この場合、中央ステーション

12からの適切なSMSメッセージを受け取ると、ワッチモードがページャーモードに切り換る。ロケーター・ユニットは、ページが受信されたことを装着者に知らせる音楽表記や音表記のような視覚表記を行う。このとき、ロケーター・ユニット18は、受信したページャー・メッセージをディスプレイ36上に表示する。

#### 【0020】

選択的には、ロケーター・ユニット18は、ヘッドフォン／マイクロフォンに対して又はヘッドフォン／マイクロフォンから有線又は狭い範囲の無線通信を受信することができる。このヘッドフォン／マイクロフォンは、PCSフォンとしてのセルラー通信を容易にするためにヘッドフォン・ポート52を通じて接続される。キーパッドがないので、装着者は、インターネット・セッションを起動する。このインターネット・セッションは、ロケーター・ユニット18を中央ステーション12のコンピュータに接続する。中央ステーション12のコンピュータは、音声認識ソフトウェアを有する。要求されると、この音声認識ソフトウェアは、ユーザがどこで要求しようとも呼出しを起動する。ロケーター・ユニット18は、電話通信の間はエア・タイムモードにする必要がある。

#### 【0021】

FCCの要求を満足するため、飛行機の旅行の間はセル・フォンをオフにする。ユーザによってセットされるように、ロケーター・ユニット18は、特定の期間（1時間～24時間）セルラーフォンの回路を切るために権利のあるキー・フォップ46を使用することによって一時的に遮断することができる。この時間が終了した後に、ロケーター・ユニット18が、自動的にオンして、低電力モード下で呼出されるのを待つ。ロケーター・ユニット18を示すアイコンは、再起動が表示されるまでエアプレーンモードを示す。希望するときは、キー・フォップを再接続することによって、追加の時間が、インクリメントされる（零にセットされる）。

#### 【0022】

キー・フォップ74が、ユーザの腕の周りのロケーター・ユニット18のアンロックとロックのために使用される。このキー・フォップは、バッテリー充電回

路にも接続している。アダプターを介して商用電源に（ロケーター・ユニット18をアンロックするために使用される同じポートに）接続されているときに、このバッテリー充電回路は、ロケーター・ユニット18を充電する。どのキー・フォップも、ロケーター・ユニット18を充電できる。しかし、権利のあるキー・フォップだけが飛行機モードを解除又は起動できる。その他のキー・フォップを所定の期間外すことができるならば、これらのその他のキー・フォップは、装着者が使用するためだけに権利のある又は権利のない充電作業のために追加できる。カーバッテリーアダプタも、キー・フォップによって旅行中の充電に対して使用できる。各ロケーター・ユニット18は、所定の数のキー・フォップを可能にするためにプログラミングできる。単一のキー・フォップが、制限されてプログラミングされることなしに多数のロケーター・ユニットを解除することができる。バッテリーがロックを解除するには低すぎる値に消耗したときは、キー・フォップと変圧器（バッテリー・チャージャ）が、バックアップ手段として使用され得る。追加のキー・フォップが、エア起動処理にわたって中央ステーション12介してロケーター・ユニットに対して権利を与えられ得る。

#### 【0023】

ディスプレイには、時間、データ、ページ数、ページデータを表示する能力がある。さらに、様々なアイコンが、アンテナ信号の強度、ロックインディケータ、ページ警報用のオーディオ・モード、飛行機モード、バッテリー充電レベルインディケータ等のようなロケーター・ユニット18の状態又は操作の現在のモードを表示する。

#### 【0024】

ロケーター・ユニット18は、タンパーを有し、検出回路76を遮断する。この検出回路76は、自己起動する緊急セッションを起動する。この緊急セッションは、干渉を示す。ロケーター・ユニット18が装着してないときに干渉されたときは、警報信号が装着者にロックされたときに発せられる。

#### 【0025】

図6中の符号25によって示されているように、暦表時データが、要求に応じてロケーター・ユニット18に配信するために中央ステーション12によって全

国的に衛生 14 からダウンロードされる。これらの暦表時は、時間に反応して、連続して変化する。したがって、このデータは、中央ステーション 12 で連続して更新する必要がある、かつ全ての時間で入手可能である。

【 0 0 2 6 】

ロケータ・ユニット 18 の C D M A プロセッサ 54 は、ロケータユニットの G P S に対しては薄いサーバとして作動する。電源 56 で得られる電力に限界があるために、G P S 受信器が衛生を見つけ出さないときは、G P S 受信器はオフになる。G P S がオンすると、G P S の結晶が適切に温まらないので、そのドリフトが衛生を見つけ出すために使用するのを不適当にする。本発明のシステムは、G P S の周波数を P C S タワーの周波数に同期させる。これらの周波数が相違していても、一致していても、位相同期周波数の誤差が、G P S ソフトウェア中にプログラミングでき、正確な周波数検索アルゴリズムを実現する。時間の正確さは、移動ユニットに供給されるときよりも高い正確さも要求する。要求される G P S 時間の正確さは、P C S タワー 22 から送信される。P C S タワー 22 とロケータ・ユニット 18 とからの距離の変動のために、これは、100  $\mu$  sec までの誤差を有する。3 シグマ・ポイントが、計算される。時間誤差とこの正確さが、タワーからの変動の調査を開始する基準時間として使用される。最初の決定に対する時間が最も重要であるので、我々は、衛生 14 から暦表時をダウンロードする主要な手段として G P S を使用しない (P C S タワーから入手できないときにだけバックアップとして使用する)。P C S フォンは、中央ステーション 12 と交信する。この中央ステーション 12 は、タワー 22 の位置に関連するベースステーション I D 番号 ( I D ) を有する。この I D は、次の暦表時のために中央ステーション 12 がロケータ・ユニット 18 に対して視覚可能な衛生 14 だけを選択することを可能にする。G P S は、特定の衛生 14 に対する暦表時がいつ有効であり、その暦表時をその検索からいつ削除されるかを知っている。以上の説明から、本発明の個人位置検出システムは、個人位置検出システムを提供することによって従来の技術の欠点を克服することができる。この個人位置検出システムは、限られたバッテリー電源でユーザの位置を突き止めるための全地球測位衛生システム ( G P S ) を使用して、敵意を持つ状態と敵意を持たない状

態の双方で行方不明の人を追跡することができる。この個人位置検出システムは、通信網とGPSの双方を無線式に接続する通信装置を有するポータブルロケータ装置を含み、通信網を通じて中央ステーションにGPSによって突き止められた位置を中継する。ポータブルロケータユニットは、ユーザの位置を正確に示すときに緊急人員を援助するための音波又は無線周波数のビーコンを発生して、中央ステーションに緊急コールを起動することができる。この場合、中央ステーションは、そのコールの応答でユーザに関する位置と状況について指定された人と交信する。ポータブルロケータユニットは、中央ステーションに対して非緊急コールを起動し、中央ステーションを指定された人と交信させ、ロケータユニットを使用して、中央ステーション経由の別の部隊に対する音声の呼出しを起動することもできる。さらに、本発明の個人位置検出システムは、単純で扱いやすく、製造コストにおいて経済的である。

【図面の簡単な説明】

【図1】

子供の位置を監視するために使用される本発明の個人位置検出システムの上方投影図である。

【図2】

ユーザの腕に装着された本発明の個人位置検出システムのポータブルロケータユニットの前方投影図である。

【図3】

本発明の個人位置検出システムのポータブルロケータユニットの側方投影図である。

【図4】

本発明の個人位置検出システムのポータブルロケータユニットの内部構成要素を示すブロック図である。

【図5】

本発明の個人位置検出システムの異なる操作モード間の流れを示す流れ図である。

【図6】

本発明の個人位置検出システムの投影図である。

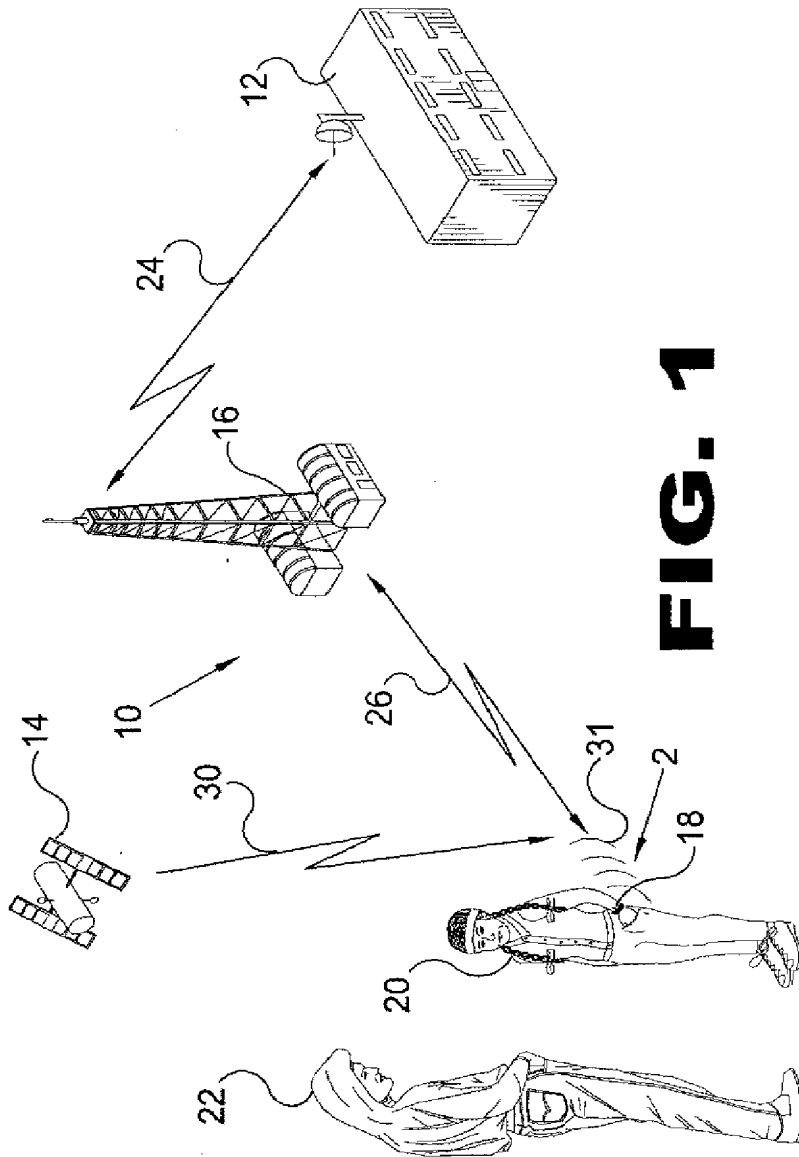
【符号の説明】

- 1 0 本発明の全地球測位追跡システム
- 1 2 中央監視ステーション
- 1 4 追跡衛生
- 1 6 局地送信／受信ステーション
- 1 8 ポータブル ロケータ ユニット
- 2 0 子供
- 2 2 子供の保護者
- 2 4 中央ステーションと中継ステーションとの間の送信を示す線
- 2 5 基準GPS受信ステーション
- 2 6 中継ステーションとロケータ ユニットとの間の送信を示す線
- 3 0 衛生からロケータ ユニットへの位置信号の送信を示す線
- 3 1 ビーコン
- 3 2 ポータブル ロケータ ユニットの装着しているユーザの腕
- 3 4 ポータブル ロケータ ユニットの滑らかな外面
- 3 6 ディスプレイ
- 3 8 ポータブル ロケータ ユニットの顔側
- 4 0 時計
- 4 1 指示
- 4 2 緊急パニック ボタン
- 4 4 非緊急位置ボタン
- 4 6 エア・モード ボタン
- 4 8 ラッチング機構
- 5 0 ロック／アンロックボタン
- 5 1 キー フォーブ ポート
- 5 2 ヘッドフォン ポート
- 5 4 プロセッサ
- 5 6 内部電源

58	バッテリー・センサ
60	記憶器
62	受信器
64	送信器
66	マイクロフォン
68	スピーカ
70	GPS送信器／受信器
72	ビーコン
74	キー フォップ
76	タンパー センサ
78	加入者
80	PSTN／セルラー通信リンク
82	インターネット接続
84	公共サービス電話ネットワーク
86	PCSタワー

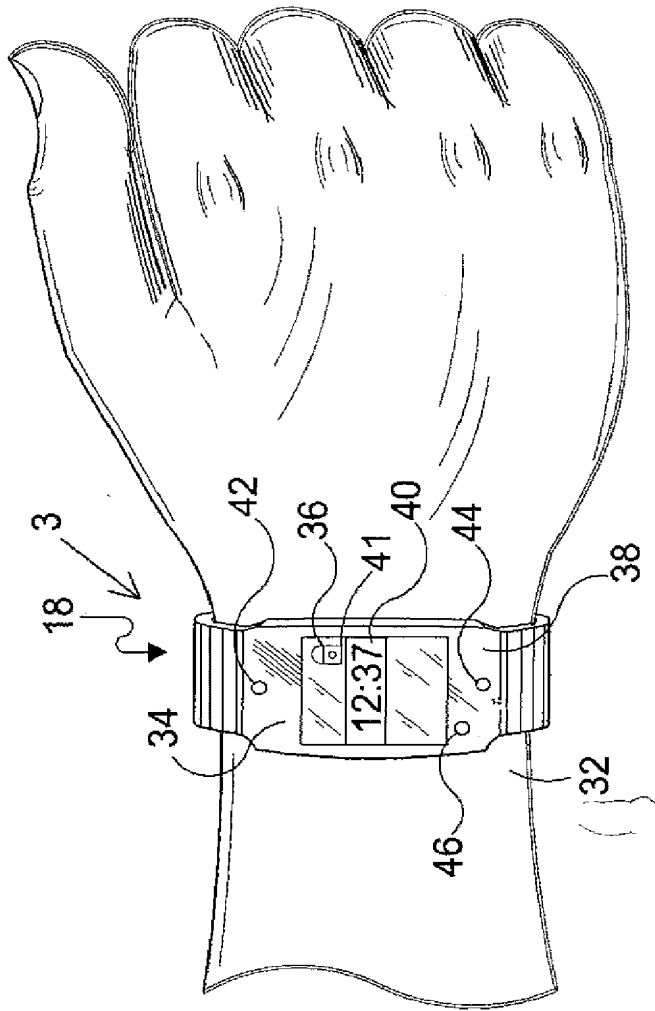


【 1 】



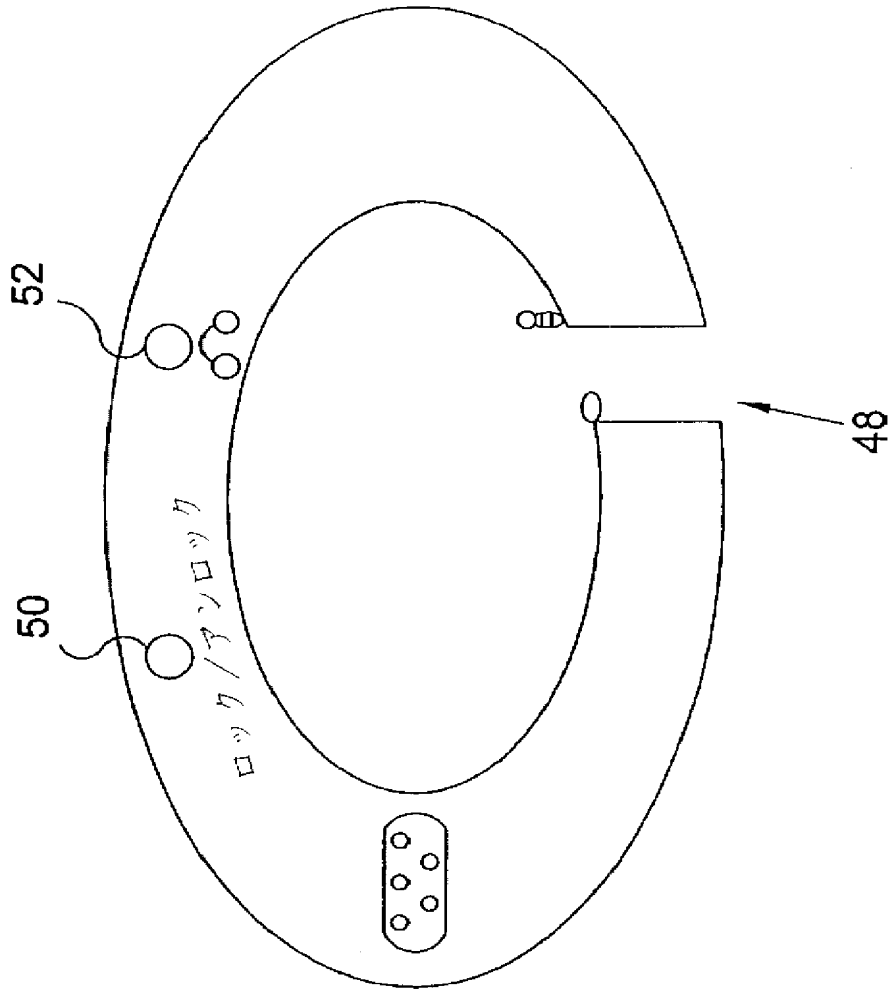
**FIG. 1**

【 2 】

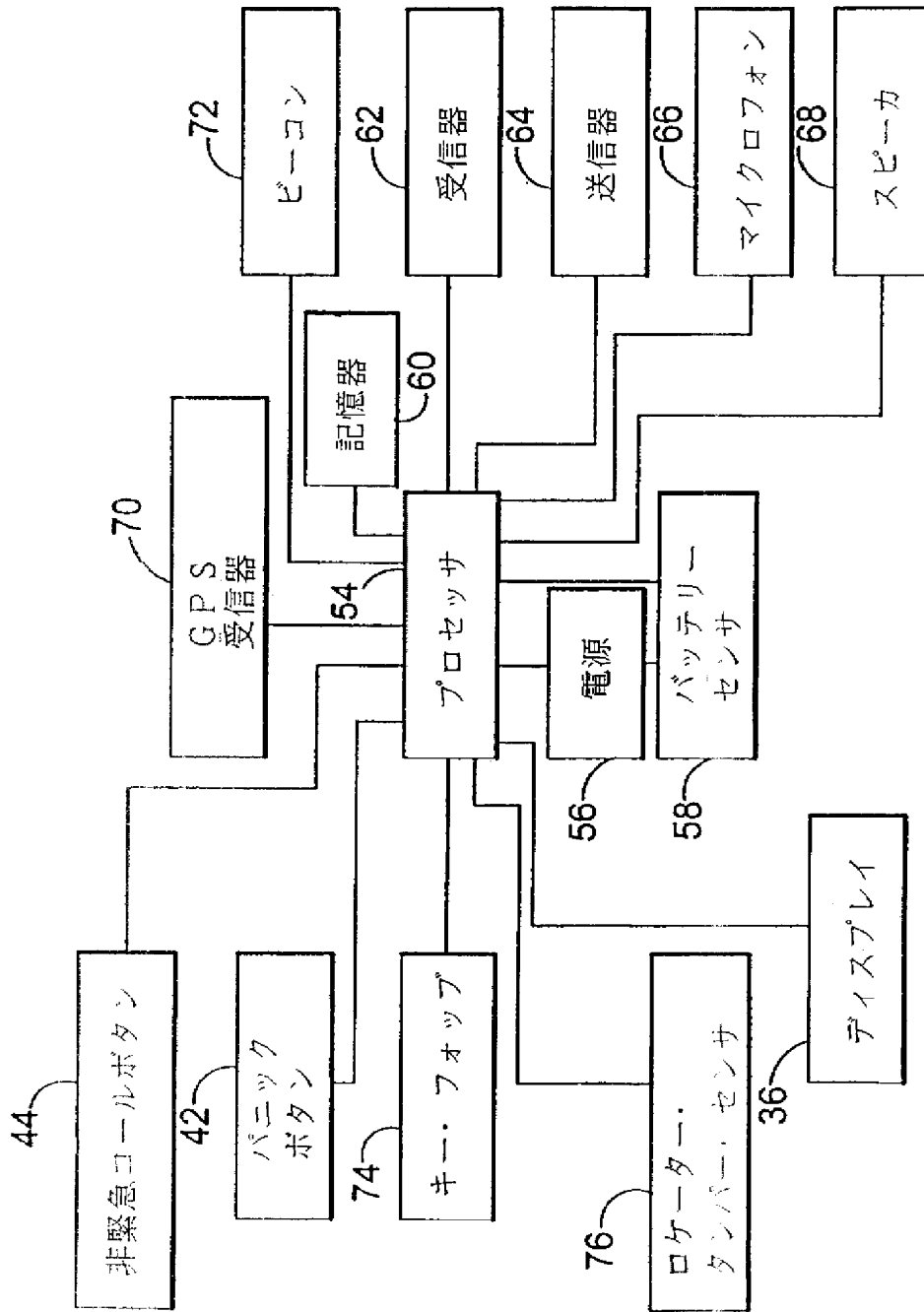


**FIG. 2**

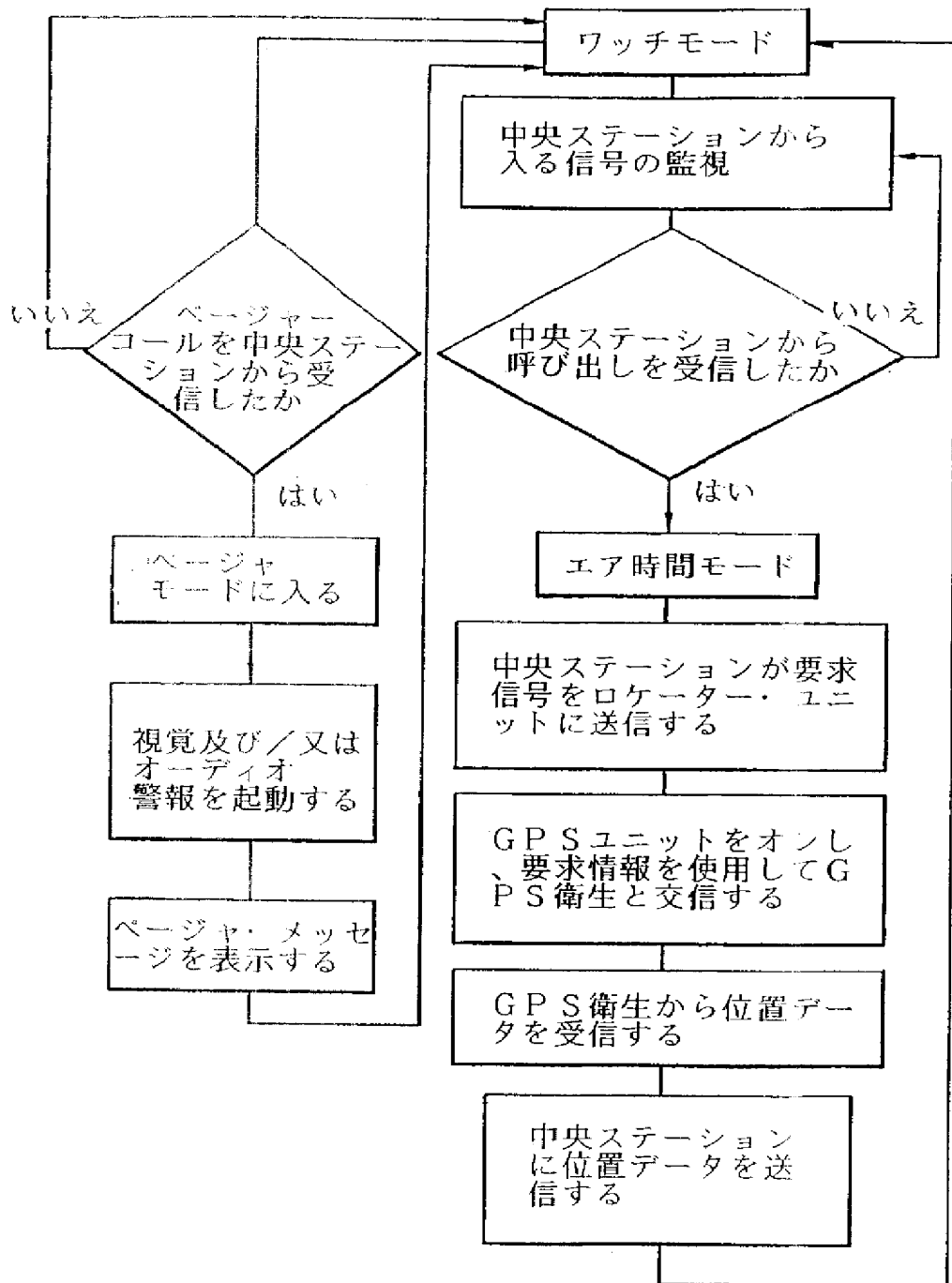
【図3】



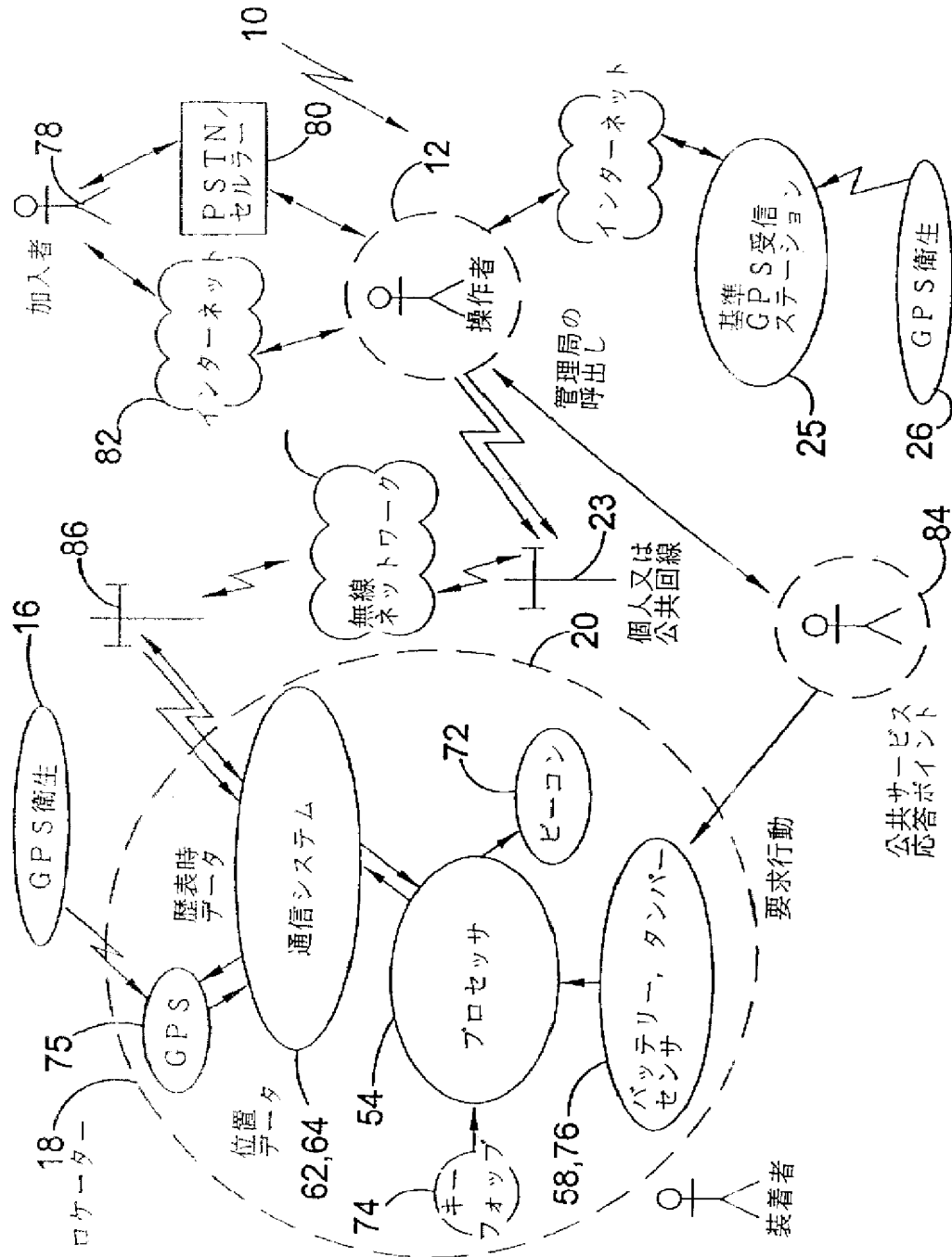
【図4】



【図5】



【図6】



【手続補正書】特許協力条約第34条補正の翻訳文提出書

【提出日】平成14年6月8日(2002.6.8)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正の内容】

【特許請求の範囲】

- 【請求項1】 a) ユーザの腕の周りに装着可能なポータブル・ハウジング
- ;
- b) 中央ステーションとの無線通信を確立し、無線送信器及び無線受信器を有する手段;
- c) この無線受信器によってこの中央ステーションから位置要求信号を受取ると、ロケータ・ユニットが、GPSシステムと交信するためにこのロケータ・ユニットの位置を突き止める全地球測位衛星システムと交信する手段を起動させ、そこから位置データを計算し、この位置データ計算を完了すると、無線送信器は、分析のためにこの位置データを中央ステーションに送信するこの手段、及び、
- d) GPSユニットと通信送信器の電力を制御してバッテリーの寿命を最小限にする手段から構成され、この場合、上記の確立手段は、POTS、セルラー、PCS又はインターネット通信網のうちの1つを利用し、さらに:
- e) 個人測位装置がいつ干渉されたかを検出し、送信器を起動させて中央ステーションに緊急信号を送信する検出センサを有する個人測位装置。

【請求項2】 個人測位装置は、中央ステーションに対して緊急信号を送信するパニックボタンをさらに有し、ユーザによる緊急状況を検出すると、中央ステーションは、この緊急信号の受取りに対する応答でこの個人測位装置に位置応答信号を転送する請求項1に記載の個人測位装置。

【請求項3】 個人測位装置は、ユーザによる起動の際に中央ステーションに対して位置要求信号を送信する非緊急コールボタンをさらに有し、中央ステーション

ションは、非緊急信号の受取りに対する応答でこの個人測位装置に対して位置応答信号を転送する請求項2に記載の個人測位装置。

【請求項4】 中央ステーションは、各個人測位装置に対して交信リストを記憶し、ユーザによる非緊急コールボタンの起動に対する応答で位置データを受取ると、この中央ステーションは、ロケータ装置の位置に関する交信リストを人に知らせる請求項3に記載の個人測位装置。

【請求項5】 個人測位装置は、この個人測位装置の位置を正確に示すときに人を援助するために超音波ビーコン信号を発生するビーコン発生器をさらに有する請求項1に記載の個人測位装置。

【請求項6】 ビーコン発生器は、無線周波数のビーコン信号を発生する請求項5に記載の個人測位装置。

【請求項7】 個人測位装置は、ユーザの腕の周りの装置をラッチする電気的なキー又は機械的なキーをさらに有する請求項1に記載の個人測位装置。

【請求項8】 個人測位装置は、ユーザの腕の周りのこの個人測位装置をラッチングするために中央ステーションから受信したラッチング命令によって起動されるラッチング機構をさらに有する請求項7に記載の個人測位装置。

【請求項9】 個人測位装置は、PCSタワーに対するクロック位相ロックと電圧制御発振器をさらに有し、この電圧制御発振器は、このPCSタワーを追跡するクロック位相ロックループからの電圧情報を利用する請求項1に記載の個人測位装置。

【請求項10】 個人測位装置は、中央ステーションを介して別の部隊に送信するためにユーザからオーディオ信号を受信するマイクロフォンを有し、かつ中央ステーションを介して別の部隊からの受信器によって受信したオーディオ信号を再生するスピーカを有する請求項1に記載の個人測位装置。

【請求項11】 a) タンパー検出センサを有するロケータ ユニットを追跡されるべき物体又は人に装着し；

b) 加入者からの位置要求を受取ると、信号を制御ステーションからロケータ ユニットの位置を要求しているこのロケータ ユニットに送信し；

c) GPS衛星信号を受信するためにこのロケータ ユニットに接続されたG



P Sユニットを起動させ、

d) P C Sタワークロックを追跡するクロック位相ロックループからの電圧情報を使用することによって時間を低減するためにG P S信号をの獲得を援助し；

e) G P S信号からの位置データを計算し；

f) 分析してロケータ ユニットの位置を突き止めるために位置データを中央ユニットへ送信し；

g) 加入者にロケータ ユニットの位置を知らせることから成る人又は物体の位置を突き止め、

h) このロケータ ユニットの干渉を検出し；

i) このロケータ ユニットの干渉を検出すると、送信器を起動して、中央ステーションに緊急信号を送信する方法。

【請求項12】 方法は、近い範囲のときにロケータ ユニットの位置を突き止める加入者を援助するためにこのロケータ ユニットのよってビーコンを発生するステップを有する請求項13に記載の方法。

【請求項13】 装着ステップは、電子キーを使用すること、器械キーを使用すること、又は中央ステーションから遠隔信号を受信して、ラッチング機構をラッチすることのうちの1つを有する請求項11に記載の方法。

【請求項14】 方法は、ロケータ ユニットの起動して、中央ステーションと交信し、そしてこのロケータ ユニットの非緊急コールボタンを起動したときに、位置要求信号の発生を開始するステップをさらに有する請求項11に記載の方法。

【請求項15】 方法は、ロケータ ユニットの位置データを受取るときに中央ステーションによって記憶された交信リスト上で身元確認された人と交信するステップをさらに有する請求項14に記載の方法。

【請求項16】 方法は、ロケータ ユニットの起動して、中央ステーションと交信し、そしてこのロケータ ユニットのパニックボタンを起動したときに、位置要求信号の発生を開始するステップをさらに有する請求項11に記載の方法。

【請求項17】 方法は、エアモード ボタンが起動すると、ロケータ


ユニットの操作を一時停止するステップをさらに有する請求項11に記載の方法

。

【請求項18】 エアモードボタンが起動すると、ロケータユニットの操作が所定の期間一時停止される請求項17に記載の方法。

【請求項19】 方法は、中央ステーションによってロケータユニットの電力レベルを監視するステップをさらに有する請求項11に記載の方法。

## 【 国際調査報告 】

INTERNATIONAL SEARCH REPORT		national application No. PCT/US01/07942		
<b>A. CLASSIFICATION OF SUBJECT MATTER</b>				
IPC(7) : G01S 5/02; H04B 7/185; H04Q 7/20 US CL : 342/357.07; 455/456				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) U.S. : 342/357.09, 357.1; 375/373-377; 455/457				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST 1.02.0008				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 5,797,091 A (CLISE et al.) 18 August 1998 (19.08.1998).	1-5, 7-8, 12		
Y		6, 9-11, 13-21		
X, P	US 6,121,922 A (MOHAN) 19 September 2000 (19.09.2000)	1-2, 5-6		
Y, P		3-4, 7-21		
Y	US 4,673,936 A (KOTOH) 16 June 1987 (16.06.1987)	7-8		
Y	US 5,014,040 A (WEAVER et al.) 7 May 1991 (07.05.1991)	1-12, 15		
Y	US 5,742,233 A (HOFFMAN et al.) 21 April 1998 (21.04.1998)	1-12		
Y	US 5,841,396 A (KRASNER) 24 November 1998 (24.11.1998)	11, 13-21		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.				
* Special categories of cited documents: <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">               "A" document defining the general state of the art which is not considered to be of particular relevance                "E" earlier application or patent published on or after the international filing date                "L" document which may throw doubts on priority date(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             </td> <td style="width: 50%;">               "T" later documents 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                "&amp;" document member of the same patent family             </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority date(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 documents 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
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority date(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 documents 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 12 June 2001 (12.06.2001)		Date of mailing of the international search report 27 AUG 2001		
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer  Thomas H. Tarcza Telephone No. 703-306-4177		

Form PCT/ISA/210 (second sheet) (July 1998)

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フロントページの続き

(81)指定国 EP(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OA(BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG), AP(GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), EA(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW

【要約の続き】

つを利用する。タンパー検出センサは、ロケータ装置がいつ干渉されたかを検出する。人がロケータ装置の位置を正確に示すのを助けるため、ビーコン発生器が、超音波又は無線周波数のビーコン信号を発生する。

(19)日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11)特許出願公開番号  
特開2003-284123  
(P2003-284123A)

(43)公開日 平成15年10月3日(2003.10.3)

(51)Int.Cl. <sup>7</sup>	識別記号	F I	テ-マ-ト*(参考)	
H 0 4 Q	7/34	G 0 1 S	5/14	5 J 0 6 2
G 0 1 S	5/14	H 0 4 B	7/26	1 0 6 A 5 K 0 6 7

審査請求 未請求 請求項の数 5 O L (全 9 頁)

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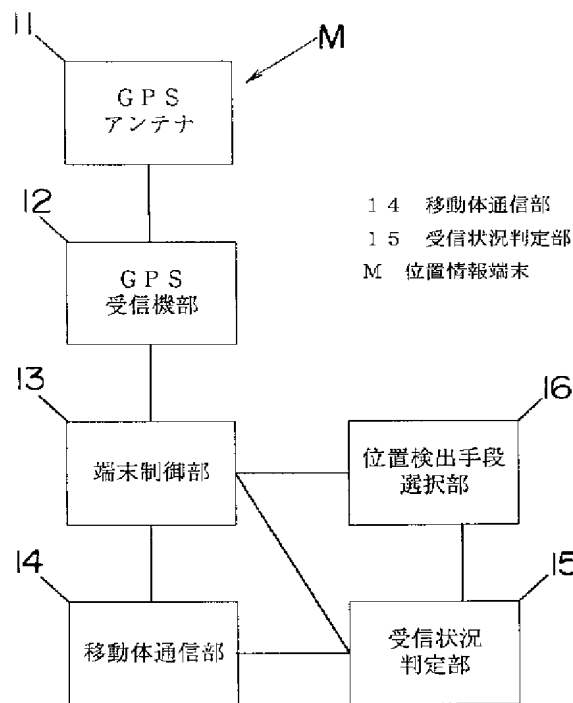
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(54)【発明の名称】 位置情報端末

(57)【要約】

【課題】 位置検出に無駄に時間を費やされたり通信料金を無駄にしたりすることを防ぐことのできる位置情報端末を提供する。

【解決手段】 位置情報端末は、移動体通信部14の受信状況を判定する受信状況判定部15を備える。受信状況判定部15は、移動体通信部14が受信可能な基地局数が既定の数未満であれば位置情報端末が郊外または山間部にあると判定し、受信可能な基地局数が既定の数以上である場合は位置情報端末が都市部にあると判定する。受信状況判定部15において位置情報端末が都市部にあると判定され且つGPSによる位置検出が失敗した場合には移動体通信手段を用いた位置検出が実行される。



## 【特許請求の範囲】

【請求項1】 公衆網に接続された基地局との間で無線信号を送受信する移動体通信手段と、前記移動体通信手段による無線信号の受信状況に基づいてGPS衛星から送信されるGPS信号の受信強度を複数段階で判定する状況判定部と、互いに異なる情報を用いて位置を検出する複数種類の位置検出手段と、前記状況判定部の判定結果に基づいて前記複数の位置検出手段から択一的に選択する位置検出手段選択部とを備え、前記位置検出手段としては、GPS信号のみを用いて位置を検出するGPS単独位置検出手段と、GPS信号を受信する固定局との間で前記移動体通信手段を介して伝送される情報とGPS衛星から受信したGPS信号とを併用して位置を検出するネットワーク型GPS位置検出手段と、前記移動体通信手段が無線信号を送受信可能な基地局の位置を基準位置として位置を検出する移動体通信位置検出手段とのうちの少なくとも2つを備え、前記位置検出手段選択部は前記状況判定部の判定によって前記位置検出手段のうち少なくとも使用可能な確率が最も高いと判断される位置検出手段を選択することを特徴とする位置情報端末。

【請求項2】 前記状況判定部は前記移動体通信手段が受信している基地局の数と前記移動体通信手段が受信している信号の受信レベルとの少なくとも一方に基づいてGPS信号の受信状況を判定することを特徴とする請求項1記載の位置情報端末。

【請求項3】 前記状況判定部は、前記移動体通信手段が受信している基地局数が既定の数以上であれば位置情報端末は都市部に位置していると判定し、前記移動体通信手段が受信している基地局数が既定の数未満であれば位置情報端末は郊外または山間部に位置していると判定することを特徴とする請求項2記載の位置情報端末。

【請求項4】 前記状況判定部は、前記移動体通信手段が受信している信号の受信レベルが既定値以上であれば位置情報端末が屋外に位置していると判定し、前記移動体通信手段が受信している信号の受信レベルが既定値未満であれば位置情報端末が屋内に位置していると判定することを特徴とする請求項2記載の位置情報端末。

【請求項5】 基地局から送信され前記移動体通信手段によって受信される基地局IDを監視し前記移動体通信手段において受信可能な基地局が変化すると位置情報端末が移動したと判定する端末移動判定部を備えることを特徴とする請求項2記載の位置情報端末。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、位置を検出する位置情報端末に関するものである。

## 【0002】

【従来の技術】従来から、GPS (Global Positioning System) を用いて位置を検出する位置情報端末が提供されている。この種の位置情

報端末として、検出した位置を画面に表示する位置情報端末や、特開平6-188819号公報に示されるように徘徊老人等に装着されその位置を位置検出要求者に無線で知らせるために用いられる位置情報端末が知られている。GPSを用いた位置検出は、図4に示すように可視範囲に存在する3つ以上のGPS衛星G1, G2, …からそれぞれ位置情報端末Mが受信したGPS信号を用いて行われる。GPS信号には、GPS信号を送信したGPS衛星G1, G2, …の軌道を示すエフェメリスと、GPS信号が送信された時刻を示す時刻情報とが含まれている。

【0003】位置情報端末Mは、エフェメリスを用いて各GPS衛星G1, G2, …の位置をそれぞれ求め、さらにGPS信号が送信された時刻とGPS信号が受信された時刻との差から位置情報端末Mと各GPS衛星G1, G2, …との疑似距離R1, R2…をそれぞれ求めることによって位置を検出する。

## 【0004】

【発明が解決しようとする課題】しかし、位置情報端末Mがビルの谷間や屋内などに位置していた場合、GPS信号を受信できないことがある。また、GPS衛星の送信する信号は微弱であるため、電波の受信状況によっては、GPS信号中の時刻情報を得ることはできてもエフェメリスを得ることができないことがある。GPS信号を受信できない位置やエフェメリスを得ることができない状況においてGPS信号のみを用いた位置検出を行うと、無駄に時間が費やされてしまう。さらに、位置検出要求者に位置を無線で知らせる位置情報端末の場合に、位置検出要求者が移動体通信の基地局を介して位置検出要求を入力する構成だと、通信料金を無駄に費やしたことになる。

【0005】本発明は、上記事由に鑑みてなされたものであり、その目的は、位置検出に無駄に時間を費やしたり通信料金を無駄にしたりすることを防ぐことのできる位置情報端末を提供することにある。

## 【0006】

【課題を解決するための手段】請求項1の発明は、公衆網に接続された基地局との間で無線信号を送受信する移動体通信手段と、前記移動体通信手段による無線信号の受信状況に基づいてGPS衛星から送信されるGPS信号の受信強度を複数段階で判定する状況判定部と、互いに異なる情報を用いて位置を検出する複数種類の位置検出手段と、前記状況判定部の判定結果に基づいて前記複数の位置検出手段から択一的に選択する位置検出手段選択部とを備え、前記位置検出手段としては、GPS信号のみを用いて位置を検出するGPS単独位置検出手段と、GPS信号を受信する固定局との間で前記移動体通信手段を介して伝送される情報とGPS衛星から受信したGPS信号とを併用して位置を検出するネットワーク型GPS位置検出手段と、前記移動体通信手段が無線信

号を送受信可能な基地局の位置を基準位置として位置を検出する移動体通信位置検出手段とのうちの少なくとも2つを備え、前記位置検出手段選択部は前記状況判定部の判定によって前記位置検出手段のうち少なくとも使用可能な確率が最も高いと判断される位置検出手段を選択することを特徴とする。

【0007】請求項2の発明は、前記状況判定部は前記移動体通信手段が受信している基地局の数と前記移動体通信手段が受信している信号の受信レベルとの少なくとも一方に基づいてGPS信号の受信状況を判定することを特徴とする。

【0008】請求項3の発明は、請求項2の発明において、前記状況判定部は、前記移動体通信手段が受信している基地局数が既定の数以上であれば位置情報端末は都市部に位置していると判定し、前記移動体通信手段が受信している基地局数が既定の数未満であれば位置情報端末は郊外または山間部に位置していると判定することを特徴とする。

【0009】請求項4の発明は、請求項2の発明において、前記状況判定部は、前記移動体通信手段が受信している信号の受信レベルが既定値以上であれば位置情報端末が屋外に位置していると判定し、前記移動体通信手段が受信している信号の受信レベルが既定値未満であれば位置情報端末が屋内に位置していると判定することを特徴とする。

【0010】請求項5の発明は、請求項2の発明において、基地局から送信され前記移動体通信手段によって受信される基地局IDを監視し前記移動体通信手段において受信可能な基地局が変化すると位置情報端末が移動したと判定する端末移動判定部を備えることを特徴とする。

【0011】

【発明の実施の形態】まず、以下の実施形態において用いられる3種類の位置検出であるGPS単独位置検出、ネットワーク型位置検出、及び移動体通信位置検出について説明する。

【0012】GPS単独位置検出においては、図4に示すように、位置情報端末Mの可視範囲に存在する3つ以上のGPS衛星G1、G2、…からそれぞれ受信したGPS信号を用いる。図5に示すように、GPS信号はGPSアンテナ1で受信され、高周波部2において中間周波数に変換される。高周波部2において変換された信号は信号処理部3において復調および復号され、GPS衛星G1、G2、…の軌道を示す情報であるエフェメリスと、GPS信号が送信された送信時刻を示す時刻情報が得られる。時刻情報は距離計測部4において用いられ、エフェメリスはデータ解析部5において用いられる。距離計測部4は、時刻情報に示された送信時刻とGPS信号が受信された受信時刻とを比較することによって、疑似距離R1、R2…を算出する。データ解析部5

はGPS衛星G1、G2、…の位置をエフェメリスに基づいて算出する。データ解析部5において得られた各GPS衛星G1、G2、…の位置と、距離計測部4において得られた各GPS衛星G1、G2、…との間の疑似距離R1、R2、…を用いて、測位演算部6が位置情報端末Mの位置を演算する。GPS単独位置検出は、GPS信号のみを用いて位置検出を行うので、通信料金がからないという利点がある。

【0013】ネットワーク型GPS位置検出は、GPS信号を受信することによって位置を検出する点はGPS単独位置検出と同様であるが、図6に示すように、常にGPS信号を受信し最新のエフェメリスを保持している固定局Bをエフェメリスの取得に利用する点が異なる。従ってGPS単独位置検出に用いられる構成(図5参照)に比べて、図7に示すように後述する固定局Bとの間で無線信号を送受信するための無線送受信部7が付加されている。無線送受信部7は、図6に示すように、測位演算部6からエフェメリスを要求する信号D1を入力されると、固定局Bへエフェメリスの送信を要求する無線信号D1'を送信し、固定局Bから送信された無線信号D2からエフェメリスD2'を得て測位演算部6に入力する。ここで、GPS単独位置検出において、エフェメリスをGPS信号から取得するには30秒程度の時間がかかる。一方、ネットワーク型GPS位置検出は、エフェメリスを固定局Bとの通信によって取得するから、GPS単独位置検出に比べ、速くエフェメリスを得ることができ、従って位置検出にかかる時間が短縮される。また、GPS信号は微弱な電波であるため、電波の受信状況によっては、GPS信号から時刻情報を得ることはできてもエフェメリスが取得できないことがあり、この場合、GPS単独位置検出では位置検出ができないが、ネットワーク型GPS位置検出ならば位置検出が可能である。また、ネットワーク型GPS位置検出は一般的にGPS単独位置検出に比べて感度が高いことが知られている。さらに、位置情報端末Mが交信している基地局の位置を固定局Bとの通信によって取得し、取得した基地局の位置を位置情報端末Mの概略位置として、位置情報端末Mの概略位置に基づいて位置検出に使用するGPS衛星を決定することもでき、この場合は可視範囲のGPS衛星を探すためにかかる時間が短縮され、位置検出にかかる時間がさらに短縮される。

【0014】移動体通信位置検出は、図8に示すように、公衆網を介して各基地局C1、C2、…と接続され各基地局C1、C2、…の位置を示す基地局位置情報を保持したセンタ装置Sを利用する。各基地局C1、C2、…からの無線信号が受信可能なエリアを以下ではそれぞれエリアZ1、Z2…と呼ぶ。各基地局C1、C2、…は、受信側で識別可能な複数のチャンネルのうち各1つのチャンネルにおいて送信元の基地局のIDを示す情報を含んだ無線信号を常時、繰り返して送信している。

ここで、エリアZ1、Z2、…が互いに重なる各基地局C1、C2、…は互いに異なったチャネルを用いている。位置情報端末Mは、位置検出の際に、基地局が無線信号を送信する複数のチャネルに対して受信を順次試みる。そして、ある1つの基地局C1から送信された無線信号を受信可能であった場合、その基地局C1の位置を示す基地局位置情報を基地局C1を介したセンタ装置Sとの無線通信によって取得し、基地局C1の位置を位置情報端末Mの位置とする。位置情報端末Mが点aにある場合のように、位置情報端末Mが複数の基地局C1～C3からの無線信号を受信可能である場合、無線信号の受信レベルが最も高い基地局の位置を位置情報端末Mの位置とする。ただし、各基地局C1～C3からの無線信号を受信可能なエリアZ1～Z3が重なる範囲内の点を選択して位置情報端末Mの位置とすることによって、位置検出の精度を向上させることもできる。移動体通信位置検出の誤差は、最大で、基地局からの信号を受信可能な距離程度であり、GPSを用いた位置検出に比べると精度は低い。また、位置検出のために基地局位置情報をセンタ装置Sとの通信によって取得する必要があり、このとき通信料金がかかってしまう。ただし、基地局からの無線信号を受信できる場所であれば、GPS信号を受信できないビルや谷間等でも使用可能であるという利点がある。

【0015】以下の各実施形態においては、使用可能な位置検出手段のうち、通信料金がかからず、かつ位置検出の精度が比較的に高いGPS単独位置検出の優先順位が最も高く、次いで通信料金はかかるもののエフェメリスが受信できない位置においても位置検出が可能なネットワークGPS位置検出、位置検出の精度は低いもののGPS信号を受信できないビルや谷間等でも使用可能な移動体通信位置検出の順に優先順位が設定されている。

【0016】(実施形態1)本実施形態における位置情報端末Mは、図1に示すように、公衆網に接続された基地局との間で無線信号を送受信する移動体通信手段としての移動体通信部14と、GPS単独位置検出手段と、移動体通信位置検出手段とを備え、移動体通信部14の受信状況に応じて選択された一方の位置検出手段によって位置検出を行う。GPS単独位置検出手段及び移動体通信位置検出手段は、端末制御部13によって制御される。

【0017】また、本実施形態における位置情報端末Mは、移動体通信部14による無線信号の受信状況に基づいて位置情報端末Mの状況を判定する状況判定部としての受信状況判定部15と、受信状況判定部15の判定に応じて位置検出手段を選択する位置検出手段選択部16とを備える。

【0018】GPS単独位置検出手段はGPS信号を受信するGPSアンテナ11と信号処理および演算を行うGPS受信機部12とからなる。GPS受信機部12

は、図5における高周波部2、信号処理部3、距離計測部4、データ解析部5、及び測位演算部6の機能を有し、GPS信号を用いて位置を検出する。

【0019】移動体通信部14は、基地局が無線信号を送信する複数のチャネルに対して順次、受信を試みることにより移動体通信部14において無線信号を受信可能な基地局の数(以下、基地局数と呼ぶ)と各基地局のIDとを得ることができる。基地局数は、受信状況判定部15が位置情報端末Mの状況を判定する際に用いられる。また、移動体通信部14は、公衆網を介して各基地局に接続されたセンタ装置と基地局を介して通信することにより、移動体通信部14が受信可能な各基地局の位置の情報を取得することができる。

【0020】受信状況判定部15は、位置情報端末Mの状況を判定する他、移動体通信部14とともに移動体通信位置検出手段としても機能する。詳しく説明すると、受信状況判定部15は、端末制御部13の制御に従って、移動体通信部14において受信レベルが最も高い基地局の位置を示す基地局位置情報を、移動体通信部14と基地局とを介したセンタ装置との通信によって取得し、基地局位置情報に示された基地局の位置を位置情報端末Mの位置として端末制御部13に出力することができる。

【0021】次に、本実施形態における位置情報端末Mの動作を説明する。外部から移動体通信部14を介して位置検出が要求されると、移動体通信部14は基地局数を検出して受信状況判定部15に入力するとともに位置情報端末Mの状況を判定させる。受信状況判定部15には、通信方式や通信事業者に応じて予め決定された数である既定数が保持されていて、基地局の数と既定数とを比較することによって位置情報端末Mの状況を判定し、結果を位置検出手段選択部16に入力する。具体的には、基地局数が既定数以上であった場合に位置情報端末Mが都市部にあると判定し、基地局数が既定数未満であった場合に位置情報端末Mが郊外または山間部にあると判定する。

【0022】受信状況判定部15によって位置情報端末Mが郊外または山間部にあると判定されたとき、位置検出手段選択部16は、GPSによる位置検出を指定するGPS指定信号を端末制御部13に入力する。一方、受信状況判定部15によって位置情報端末Mが都市部にあると判定された場合、位置検出手段選択部16は、GPS指定信号を端末制御部13に入力するとともに時限動作を開始する。端末制御部13は、GPS指定信号が入力されると、GPS受信機部12にGPS単独位置検出を開始させる。その後、端末制御部13は、GPS受信機部12から位置検出の結果得られた位置情報が入力されると、入力された位置情報を移動体通信部14を介して位置検出要求者に返送するとともに、位置検出手段選択部16が時限動作を開始していればこれを中断させ



る。

【0023】位置検出手段選択部16は時限時間が満了すると、移動体通信部14による位置検出を指定する移動体通信指定信号を端末制御部13に入力する。端末制御部13は、移動体通信指定信号が入力されると、受信状況判定部15に移動体通信位置検出を開始させる。位置検出が完了し受信状況判定部15から位置検出の結果得られた位置情報が入力されると、端末制御部13は移動体通信部14を介して位置情報を位置検出要求者に返送する。

【0024】本実施形態によれば、受信状況判定部15において位置情報端末Mが都市部にありと判定され且つGPSによる位置検出が失敗したときに、位置情報端末Mは移動体通信位置検出を行うので、GPS信号が受信できない位置においてGPSによる位置検出を継続することによって時間や通信料金が無駄に費やされることを防ぐことができる。

【0025】なお、移動体通信部14として、PHS (Personal Handyphone System) や携帯電話を接続して用いる構成としてもよい。

【0026】また、受信状況判定部15が、位置検出要求が入力されたときだけではなく、電源が入っているときに位置情報端末Mの状況を定期的に判定する構成としてもよい。この構成を採用すれば、位置検出の際の状況判定を省略することにより位置検出にかかる時間を短縮することができる。

【0027】また、位置情報端末Mの所有者が位置情報を得ることができるように、図2に示すように位置情報端末Mの所有者が端末制御部13に位置検出要求を入力するキーボードやタッチパネルなどの入力装置部17と、位置検出の結果等が表示される液晶パネルなどの表示部18とを設けてもよい。

【0028】また、図3に示すように位置情報端末Mの移動を判定する端末移動判定部51を設けてもよい。端末移動判定部51は、移動体通信部14において受信可能な基地局のIDを監視し、受信できなかった基地局が受信できるようになったり、受信できていた基地局が受信できなくなったときに位置情報端末Mが移動したと判定し、位置情報端末Mが移動したことを示す信号を端末制御部13に出力する。端末制御部13は、端末移動判定部51から入力された信号をトリガとして使い、例えば位置情報端末Mが移動したことを移動体通信部14を介して位置情報端末Mの管理者などに知らせて位置検出要求の送信を促すことができる。また、図2のように表示部18を設け、位置情報端末Mが移動したという情報を表示部18に表示する構成としてもよい。

【0029】ここで、GPSアンテナ11及びGPS受信機部12はGPS単独位置検出手段としたが、移動体通信手段14とともにネットワーク型GPS位置検出手段として用いてもよい。この場合、GPS受信機部12

はエフェメリスをGPS信号から得る代わりに、移動体通信部14を介した通信によって取得する。このとき移動体通信部14は無線送受信部7(図7参照)に対応する。

【0030】また、受信状況判定部15は位置検出手段Mの状況を3段階に判定し、位置検出手段選択部16は受信状況判定部15の判定結果によって異なる時限時間で時限動作を開始する構成としてもよい。例えば、第1の既定数と第1の既定数よりも小さい第2の既定数とが設定されていて、受信状況判定部15は基地局数が第1の既定数以上であれば位置情報端末Mが都市部にありと判定し、基地局数が第2の既定数以上かつ第1の既定数未満であれば位置情報端末Mが郊外にありと判定し、基地局数が第2の既定数未満であれば位置情報端末Mが山間部にありと判定する構成とする。ここで、位置情報端末Mが都市部にありと判定された場合の時限時間よりも位置情報端末Mが郊外にありと判定された場合の時限時間を長く設定し、位置情報端末Mが山間部にありと判定された場合の時限時間は位置情報端末Mが郊外にありと判定された場合の時限時間よりもさらに長く設定する。

【0031】また、GPS単独位置検出と移動体通信位置検出とに加えてネットワーク型GPS位置検出も選択可能とし、位置検出手段選択部16は受信状況判定部15の判定毎に異なる位置検出手段を選択する構成を採用してもよい。詳しく説明すると、位置検出手段選択部16は、どの場合にもまずGPS単独位置検出を端末制御部13に指定し、位置情報端末Mが都市部にありと判定された場合と、位置情報端末Mが郊外にありと判定された場合とはそれぞれ時限動作を開始する。そして、位置情報端末Mが都市部にありと受信状況判定部15によって判定され且つGPS単独位置検出が時限時間以内に成功しなかったとき(以下、GPS単独位置検出が失敗したときと呼ぶ)は移動体通信位置検出を、郊外にありと判定され且つGPS単独位置検出が失敗したときはネットワーク型GPS位置検出を、それぞれ端末制御部13に指定する。この構成によれば、郊外においてGPS信号からエフェメリスを取得できない場合にはネットワーク型GPS位置検出を行うから、時間や通信料金が無駄に費やされることがさらに少なくなる。

【0032】(実施形態2)本実施形態における位置情報端末Mは、実施形態1と同様に図1に示す構成を備える。GPS受信機部12はエフェメリスをGPS信号から得ることも、移動体通信部14を介した通信によって取得することもできる。言い換えると、本実施形態における位置情報端末MはGPS単独位置検出手段とネットワーク型GPS位置検出手段とを備える。

【0033】また、本実施形態における位置検出手段選択部16は、位置検出の過程において、受信状況判定部15によって位置情報端末Mが郊外または山間部にありと判定されたとき、GPS単独位置検出を指定するGP

S指定信号を端末制御部13に入力する。一方、受信状況判定部15によって位置情報端末Mが都市部にあると判定された場合、位置検出手段選択部16はGPS指定信号を端末制御部13に入力するとともに時限動作を開始する。端末制御部13は、GPS指定信号が入力されると、GPS受信機部12にGPS単独位置検出を開始させる。その後、端末制御部13は、GPS受信機部12から位置検出の結果得られた位置情報が入力されると、入力された位置情報を移動体通信部14を介して位置検出要求者に返送するとともに、位置検出手段選択部16が時限動作を開始していれば時限動作を中断させる。位置検出手段選択部16は、時限時間が満了した場合、ネットワーク型GPS位置検出を指定するネットワークGPS指定信号を端末制御部13に入力する。端末制御部13は、ネットワーク型GPS指定信号が入力されると、GPS受信機部12にネットワーク型GPS位置検出を開始させる。その後、端末制御部13は、GPS受信機部12から位置検出の結果得られた位置情報が入力されると、入力された位置情報を移動体通信部14を介して位置検出要求者に返送する。その他の構成は実施形態1と同様である。

【0034】ここで、主に都市部において、電波の受信状況によってはGPS信号から時刻情報は得られてもエフェメリスが得られないことがあるが、本実施形態によれば、位置情報端末Mが都市部にあると判定したときはGPS単独位置検出を一定時間行った後、ネットワーク型GPS位置検出を行うので、位置情報端末Mがエフェメリスを得られない状態にある時にGPS単独位置検出を継続することによって時間や通信料金が無駄に費やされることを防ぐことができる。

【0035】なお、実施形態1と同様に移動体通信位置検出も選択可能とし、ネットワーク型GPS位置検出が失敗した場合に移動体通信位置検出を開始する構成としてもよい。この構成においては、位置検出手段選択部16は、ネットワーク型GPS指定信号を入力する際にも時限動作を開始し、時限時間が満了してもネットワーク型GPS位置検出が成功しなかった場合には移動体通信指定信号を端末制御部13に入力する。この構成を採用すれば、GPS信号が受信できない位置においてネットワーク型GPS位置検出を継続することによって時間や通信料金が無駄に費やされることを防ぐことができる。

【0036】また、実施形態1と同様に、図2に示す構成や図3に示す構成を採用してもよい。

【0037】(実施形態3)本実施形態における位置情報端末Mは、実施形態1と同様に図1に示す構成を備え、GPS単独位置検出手段と移動体通信位置検出手段とを備える。位置検出手段選択部16は、移動体通信部14における基地局からの信号の受信レベル(以下、受信レベルと呼ぶ)に応じて一方の位置検出手段を選択する。詳しく説明すると、位置検出が開始された際、受信

状況判定部15は、受信レベルが既定値以上であったとき、位置情報端末Mが屋外にあると判定する信号を位置検出手段選択部16に入力する。位置検出手段選択部16は、位置情報端末Mが屋外にあると判定する信号が入力されると、GPS指定信号を端末制御部13に入力する。一方、受信状況判定部15は、受信レベルが既定値未満であったとき、位置情報端末Mが屋内にあると判定する信号を位置検出手段選択部16に入力する。位置検出手段選択部16は、位置情報端末Mが屋内にあると判定する信号が入力されると、移動体通信指定信号を端末制御部13に入力する。その他の構成は実施形態1と同様である。

【0038】ここで、移動体通信の基地局の多くは屋外に配置されるため、屋内においては一般に移動体通信の基地局からの信号の受信レベルは低くなる。本実施形態によれば、移動体通信部14の受信レベルが既定値未満であればGPS単独位置検出やネットワーク型GPS位置検出を行わず、移動体通信位置検出を行うので、受信状況を判定する際に基準となる既定値を適宜設定すれば、GPS信号の受信が難しい屋内においてGPSによる位置検出を行う場合のように無駄に時間や通信料金が無駄に費やされることを防ぐことができる。

【0039】ここで、本実施形態においてはGPSアンテナ11及びGPS受信機部12をGPS単独位置検出手段として用いたが、移動体通信手段14とともにネットワーク型GPS位置検出手段として用いてもよい。言い換えると、GPS受信機部12はエフェメリスをGPS信号から得る代わりに、移動体通信部14を介した通信によって取得する構成としてもよい。

【0040】または、上記の3種類の位置検出を全て選択可能とし、受信状況判定部15は位置情報端末Mの状況を3段階に判定し、位置検出手段選択部16は受信状況判定部15の判定毎に異なる位置検出手段を選択する構成を採用してもよい。詳しく説明すると、第1の既定値と第1の既定値よりも小さい第2の既定値とが設定されていて、受信状況判定部15は受信レベルが第1の既定値以上であれば位置情報端末Mが電波の受信状況のよい屋外にあると判定し、受信レベルが第2の既定値以上かつ第1の既定値未満であれば位置情報端末Mが電波の受信状況の悪い屋外にあると判定し、受信レベルが第2の既定値未満であれば位置情報端末Mが屋内にあると判定する。位置検出手段選択部16は、位置情報端末Mが電波の受信状況のよい屋外にあると受信状況判定部15によって判定されたときはGPS単独位置検出を、電波の受信状況の悪い屋外にあると判定されたときはネットワーク型GPS位置検出を、位置情報端末Mが屋内にあると判定されたときは移動体通信位置検出を、それぞれ端末制御部13に指定する。

【0041】また、以下のような構成を採用してもよい。この構成では、受信状況判定部15は内部にタイマ

を有し、定期的に受信レベルを監視し、受信レベルが既定値以上であるときには端末制御部13にGPS単独位置検出を指定する。端末制御部13はGPS受信機部12において得られた位置情報を保持するメモリ(図示せず)を備える。受信レベルが既定値未満である状態において位置検出要求が入力された場合は位置検出を行わず、端末制御部13のメモリに最後に格納された位置情報を出力する。

【0042】さらに、図3に示すように、実施形態1で述べた端末移動判定部51を設け、位置情報端末Mが移動したと端末移動判定部51が判定したときに出力する信号を、端末制御部13は位置検出を開始するトリガとして用い、メモリに保持された位置情報を更新する構成としてもよい。

【0043】また、実施形態1と同様に、図2に示す構成を採用してもよい。

【0044】  
【発明の効果】請求項1の発明は、移動体通信の受信状況に基づいて判定されたGPS信号の受信状況に合わせて位置検出手段が選択されるから、時間や通信料金が無駄になることを防ぐことができる。

【0045】請求項3の発明は、GPS信号からエフェメリスを得ることができない状況やGPS信号が受信できない状況が発生しやすい都市部に位置情報端末Mがあると状況判定部によって判定され、且つ一定時間位置検出ができなかった場合に優先順位の低い位置検出を行うので、GPS信号からエフェメリスを得ることができない状況においてGPS単独位置検出を継続することや、GPS信号を受信できない状況においてGPS単独位置検出やネットワーク型GPS位置検出を継続することによって時間や通信料金が無駄になることを防ぐことができる。

【0046】請求項4の発明は、GPS信号が受信できない屋内においてGPSによる位置検出を行って時間や通信料金を無駄にすることを防ぐことができる。

【0047】請求項5の発明は、移動体通信手段において受信可能な基地局のIDを監視し受信可能な基地局が変化したときに位置情報端末が移動したと判定する端末移動判定部を備えるので、端末移動判定部が出力する信号を、例えば位置検出を行うトリガとして使用することができる。

【図面の簡単な説明】

【図1】本発明の実施形態を示すブロック図である。

【図2】本発明の実施形態の別の形態を示すブロック図である。

【図3】本発明の実施形態の更に別の形態を示すブロック図である。

【図4】GPS単独位置検出の原理説明図である。

【図5】GPS単独位置検出手段の構成を示すブロック図である。

【図6】ネットワーク型GPS位置検出の原理説明図である。

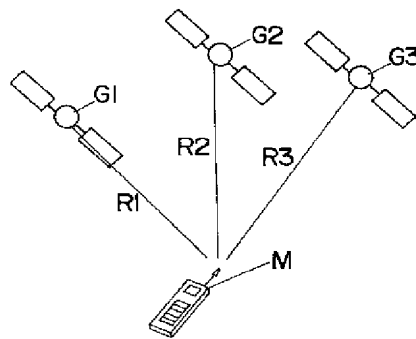
【図7】ネットワーク型GPS位置検出手段の構成を示すブロック図である。

【図8】移動体通信位置検出の原理説明図である。

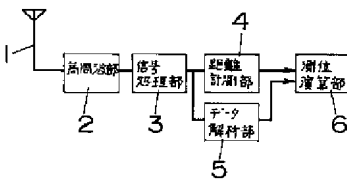
【符号の説明】

- 11 GPSアンテナ
- 12 GPS受信機部
- 14 移動体通信部
- 15 受信状況判定部
- 16 位置検出手段選択部
- 51 端末移動判定部
- M 位置情報端末

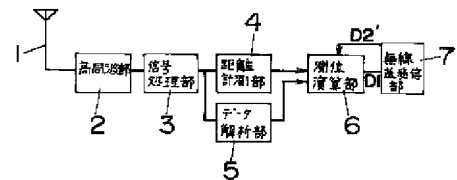
【図4】



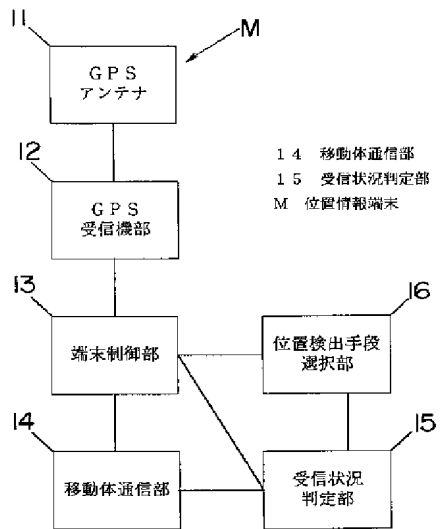
【図5】



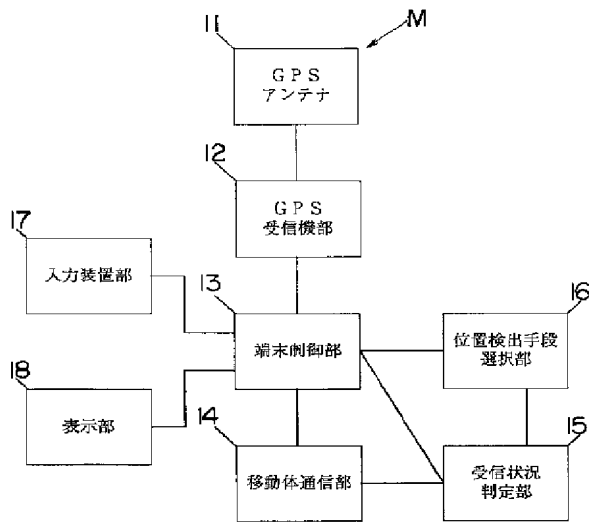
【図7】



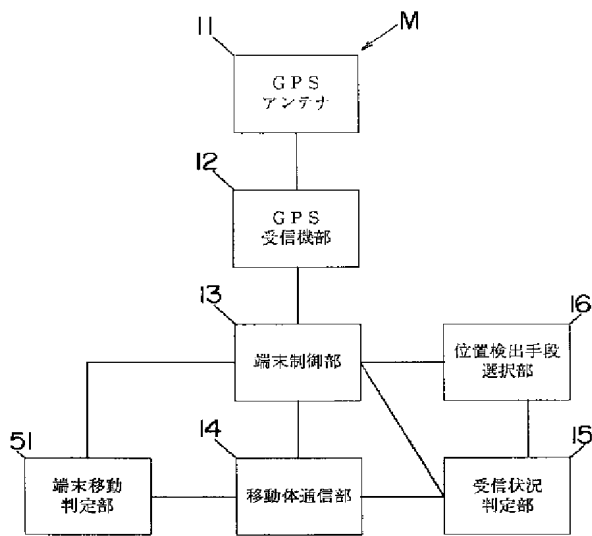
【図1】



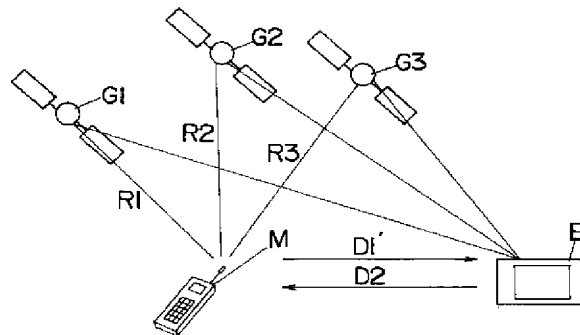
【図2】



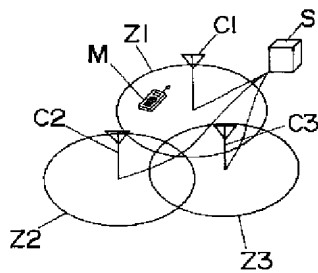
【図3】



【図6】



【図8】



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Fターム(参考) 5J062 AA08 AA13 CC07  
5K067 BB41 DD43 DD44 EE07 EE10  
FF03 HH22

(19) 日本国特許庁 (JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2005-210204

(P2005-210204A)

(43) 公開日 平成17年8月4日 (2005. 8. 4)

(51) Int. Cl. <sup>7</sup>	F 1	テーマコード (参考)
H04M 11/00	H04M 11/00 301	5C087
G08B 25/04	G08B 25/04 K	5K024
G08B 25/10	G08B 25/10 D	5K067
H04M 3/42	H04M 3/42 U	5K101
H04Q 7/34	H04B 7/26 106A	
審査請求 未請求 請求項の数 7 O L (全 9 頁) 最終頁に続く		

(21) 出願番号 特願2004-12035 (P2004-12035)  
 (22) 出願日 平成16年1月20日 (2004. 1. 20)

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 Fターム(参考) 5C087 AA03 BB20 BB72 DD03 DD49  
 FF08 GG08  
 5K024 AA79 CC11 CC14 DD00 GG01  
 GG03 GG10 GG13  
 5K067 BB04 FF03 FF05 FF19 FF20  
 HH23 JJ52 JJ56 KK05  
 5K101 KK13 LL12 MM07 NN21 RR12

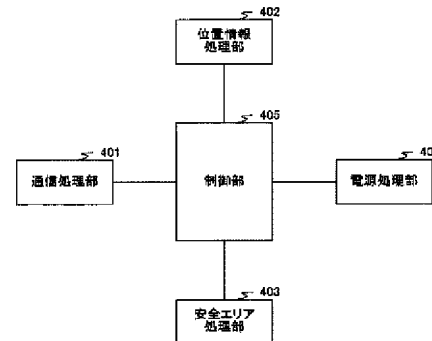
(54) 【発明の名称】 制御装置

(57) 【要約】

【課題】 携帯端末装置が、設定されたエリアを出た場合に、エリアを設定した側の携帯端末装置に通報すること。

【解決手段】 位置情報処理部402は、第1の携帯端末装置と第2の携帯端末装置の位置情報を記憶する。安全エリア処理部403は、第1の携帯端末装置にて設定された安全エリア情報を記憶する。電源処理部404は、第2の携帯端末装置の電源のON/OFFを識別する。制御部405は、第2の携帯端末装置が設定された安全エリアを出るなどの予め設定された条件に基づき第1の携帯端末装置に通報を行う。

【選択図】 図4



**【特許請求の範囲】****【請求項1】**

自己の位置情報を検出することができる第1及び第2の携帯端末装置がそれぞれ出力した位置情報を記憶する位置情報記憶手段と、前記第2の携帯端末装置の安全エリアを示す情報である安全エリア情報を記憶する安全エリア記憶手段と、前記位置情報と前記安全エリア情報を照合し、前記第2の携帯端末装置が安全エリアを出た場合には、前記第1の携帯端末装置に通報を行う制御手段と、を具備することを特徴とする制御装置。

**【請求項2】**

前記安全エリア記憶手段は、前記第1の携帯端末装置により設定された安全エリア情報を記憶することを特徴とする請求項1記載の制御装置。

**【請求項3】**

前記第1及び第2の携帯端末装置が送出した位置情報に基づいて前記第1及び第2の携帯端末装置の距離を検出する距離検出手段を具備し、前記制御手段は、予め設定した以上に前記第1と第2の携帯端末装置の距離が開いた場合には、前記第1の携帯端末装置に通報を行うことを特徴とする請求項1または請求項2記載の制御装置。

**【請求項4】**

前記位置情報記憶手段は、前記第2の携帯端末装置の位置情報を検出し、予め設定された一定時間以上移動が確認されなかった場合には、前記第1の携帯端末装置に通報を行うことを特徴とする請求項1から請求項3のいずれかに記載の制御装置。

**【請求項5】**

前記第2の携帯端末装置の電源ON/OFFを検出する電源ON/OFF検出手段を具備し、前記制御手段は、前記第2の携帯端末装置の電源がOFFになった場合には、前記第2の携帯端末装置の電源がOFFになった旨及びOFFになった位置を前記第1の携帯端末装置に通報することを特徴とする請求項1から請求項4のいずれかに記載の制御装置。

**【請求項6】**

自己の位置情報を検出する位置情報検出手段と、他の携帯端末装置の行動範囲を設定する安全エリア設定手段と、前記安全エリア設定手段にて設定された行動範囲を前記他の携帯端末装置が出たときに危険通知を行うか否かを選択することができる危険通知設定手段と、前記位置検出手段にて検出した位置情報、前記安全エリア設定手段にて設定した安全エリア設定情報、前記危険通知設定手段にて設定した危険通知設定情報を請求項1から請求項5のいずれかに記載の制御装置に出力する通信処理手段と、を具備することを特徴とする携帯端末装置。

**【請求項7】**

自己の位置情報を検出することができる第1及び第2の携帯端末装置がそれぞれ出力した位置情報を記憶する位置情報記憶工程と、前記第2の携帯端末装置の安全エリアを示す情報である安全エリア情報を記憶する安全エリア記憶工程と、前記位置情報と前記安全エリア情報を照合し、前記第2の携帯端末装置が安全エリアを出た場合には、前記第1の携帯端末装置に通報を行う制御工程と、を具備することを特徴とする制御方法。

**【発明の詳細な説明】****【技術分野】****【0001】**

本発明は制御装置に関し、特に、設定されたエリアを携帯端末装置が出た場合などに、直ちにエリアを設定した側の携帯端末装置に通報するシステムに適用される制御装置に関する。

**【背景技術】****【0002】**

近年、児童誘拐事件の多発や老人の徘徊問題などから、子供、老人等の居場所を遠隔地からでも把握したいという要望が増加している。

**【0003】**

従来、この要望に応えるために、各通信事業者からPHSや携帯端末装置等を用いて第三者が位置検索するサービスが提供されている(例えば非特許文献1)。

【0004】

また、位置情報サービスの付加サービスとして、緊急時に発信者が救急信号を送ると緊急連絡先に状況を知らせて対処員が急行するサービスも提供されている(例えば非特許文献2)。

【非特許文献1】[http://www.nttdocomo.co.jp/p\\_s/service/](http://www.nttdocomo.co.jp/p_s/service/)

【非特許文献2】[http://www.855756.com/info/m\\_mob\\_top.html](http://www.855756.com/info/m_mob_top.html)

【発明の開示】

【発明が解決しようとする課題】

【0005】

しかしながら、従来の位置情報サービスでは、検索を行った時点での現在位置が分かるのみであり、子供の居場所を常時監視しようとするれば、頻繁に検索を行う必要が生じ、不便である。また、緊急時には、子供側からアクションを取らないと通報を行うことはできず、子供が危険と分からずに連れ去られた場合には、通報は行われない。

【0006】

さらに、子供が連れ去られた場合に、犯人が端末を捨てる、壊すあるいは電源を切った場合には検索自体が不可能になる。

【0007】

本発明はかかる点に鑑みてなされたものであり、子供側の携帯端末装置が、設定されたエリアを出た場合や電源がOFFになった場合、あるいは一定時間位置が動かなくなった場合に、親側の携帯端末装置に通報する制御装置の提供を目的とする。

【課題を解決するための手段】

【0008】

本発明の制御装置は、自己の位置情報を検出することができる第1及び第2の携帯端末装置がそれぞれ出力した位置情報を記憶する位置情報記憶手段と、前記第2の携帯端末装置の安全エリアを示す情報である安全エリア情報を記憶する安全エリア記憶手段と、前記位置情報と前記安全エリア情報を照合し、前記第2の携帯端末装置が安全エリアを出た場合には、前記第1の携帯端末装置に通報を行う制御手段とを具備する構成を採る。

【0009】

この構成によれば、前記第2の携帯端末装置が設定された安全エリアを出た場合に、直ちに前記第1の携帯端末装置に通報するため、迅速に危険を察知することができる。

【0010】

本発明の制御装置は、前記安全エリア記憶手段は、前記第1の携帯端末装置により設定された安全エリア情報を記憶する構成を採る。

【0011】

この構成によれば、前記第1の携帯端末装置が設定した安全エリアを前記第2の携帯端末装置が出た場合に直ちに前記第1の携帯端末装置に通報するため、迅速に危険を察知することができる。

【0012】

本発明の制御装置は、前記第1及び第2の携帯端末装置が送出した位置情報に基づいて前記第1及び第2の携帯端末装置の距離を検出する距離検出手段を具備し、前記制御手段は、予め設定した以上に前記第1と第2の携帯端末装置の距離が開いた場合には、前記第1の携帯端末装置に通報を行う構成を採る。

【0013】

この構成によれば、予め設定された以上に、前記第1と第2の携帯端末装置の距離が開いた場合に、直ちに前記第1の携帯端末装置に通報するため、迅速に危険を察知することができる。

【0014】

本発明の制御装置は、前記位置情報記憶手段は、前記第2の携帯端末装置の位置情報を



検出し、予め設定された一定時間以上移動が確認されなかった場合には、前記第1の携帯端末装置に通報を行う構成を採る。

【0015】

この構成によれば、予め設定された一定時間以上第2の携帯端末装置の移動が無かった場合に、直ちに前記第1の携帯端末装置に通報するため、迅速に危険を察知することができる。

【0016】

本発明の制御装置は、前記第2の携帯端末装置の電源ON/OFFを検出する電源ON/OFF検出手段を具備し、前記制御手段は、前記第2の携帯端末装置の電源がOFFになった場合には、前記第2の携帯端末装置の電源がOFFになった旨及びOFFになった位置を前記第1の携帯端末装置に通報する構成を採る。

【0017】

この構成によれば、前記第2の携帯端末装置の電源がOFFになった場合に、直ちに前記第1の携帯端末装置に通報することにより、迅速に危険を察知することができる。

【0018】

本発明の携帯端末装置は、自己の位置情報を検出する位置情報検出手段と、他の携帯端末装置の行動範囲を設定する安全エリア設定手段と、前記安全エリア設定手段にて設定された行動範囲を前記他の携帯端末装置が出たときに危険通知を行うか否かを選択することができる危険通知設定手段と、前記位置検出手段にて検出した位置情報、前記安全エリア設定手段にて設定した安全エリア設定情報、前記危険通知設定手段にて設定した危険通知設定情報を請求項1から請求項5のいずれかに記載の制御装置に出力する通信処理手段とを具備する構成を採る。

【0019】

この構成によれば、前記第2の携帯端末装置に対して、所望の安全エリアを設定することができる。

【0020】

本発明の制御方法は、自己の位置情報を検出することができる第1及び第2の携帯端末装置がそれぞれ出力した位置情報を記憶する位置情報記憶工程と、前記第2の携帯端末装置の安全エリアを示す情報である安全エリア情報を記憶する安全エリア記憶工程と、前記位置情報と前記安全エリア情報を照合し、前記第2の携帯端末装置が安全エリアを出た場合には、前記第1の携帯端末装置に通報を行う制御工程とを具備するようにした。

【0021】

この方法によれば、設定された安全エリアを前記第2の携帯端末装置が出た場合に、直ちに前記第1の携帯端末装置に通報するため、迅速に危険を察知することができる。

【発明の効果】

【0022】

本発明によれば、制御装置が、携帯端末装置に設定された安全エリアを出た場合や電源がOFFになった場合に、直ちに安全エリアを設定した側の携帯端末装置に通報することにより、迅速に危険を察知することができる。

【発明を実施するための最良の形態】

【0023】

本発明の骨子は、制御装置が、一方の携帯端末装置に設定された安全エリアを出た場合や、携帯端末装置の電源がOFFになった場合に、直ちにもう一方の携帯端末装置に通報することである。

【0024】

以下、本発明の実施の形態について図面を参照して詳細に説明する。

【0025】

(実施の形態)

図1は、本発明の一実施の形態に係る通信システムを示すブロック図である。

【0026】

図1の通信システムは、携帯端末装置100と、携帯端末装置200と、携帯電話ネットワーク300と、制御装置400とから主に構成される。以下、図1のシステムを危険通知システムという。

【0027】

携帯端末装置100は、自己の位置情報及び携帯端末装置200の行動範囲を設定し、位置情報及び設定した安全エリア情報を制御装置400へ出力する。携帯端末装置200は、自己の位置情報を制御装置400へ出力する。携帯電話ネットワーク300は、携帯端末装置100と、携帯端末装置200と、制御装置400をつないでいる。制御装置400は、携帯端末装置100及び携帯端末装置200から出力された情報に基づき、携帯端末装置200が携帯端末装置100の設定した行動範囲を出た場合や、携帯端末装置200の電源がOFFになった際には、携帯端末装置100へ通報を行う。

【0028】

図2は、携帯端末装置100の構成を示すブロック図である。

【0029】

携帯端末装置100は、位置センサー201と、距離センサー202と、安全エリア設定部203と、危険通知設定部204と、制御部205と、通信処理部206とから主に構成される。

【0030】

位置センサー201は、GPSもしくは基地局との測位に基づき、携帯端末装置100の位置情報を検知する。

【0031】

距離センサー202は、近距離無線技術などに基づき、携帯端末装置200との距離を測定する。

【0032】

安全エリア設定部203は、携帯端末装置200が安全に行動することのできる安全エリアを設定する。具体的には、学校から自宅の住所を入力することにより適切な行動範囲を出力し設定する方法や、自宅から半径何メートルといった設定方法、ペン入力に基づき地図上で自由に安全エリアを設定する方法など、ユーザの利便性に合わせて選択できるものとする。

【0033】

危険通知設定部204は、危険通知システムを動作させるか否かを選択する手段であり、子供が家に戻っている時など、特に動作が不要な場合には自由にON/OFFの選択が可能となるものである。

【0034】

制御部205は、携帯端末装置100における動作の制御を行う。具体的には、位置センサー201、距離センサー202、安全エリア設定部203、危険通知設定部204からの情報を制御し、通信処理部206を介して、制御装置400へ情報を出力する。

【0035】

通信処理部206は、既存の携帯電話、PHSネットワークに接続可能なモデムを有し、携帯端末装置100の位置情報及び設定した安全エリアの設定情報を制御装置400に対して出力する。

【0036】

図3は、携帯端末装置200の構成を示すブロック図である。

【0037】

携帯端末装置200は、位置センサー301と、距離センサー302と、危険通知設定部303と、制御部304と、通信処理部305とから主に構成される。

【0038】

携帯端末装置200は、安全エリア設定部を有していない点を除くと、携帯端末装置100と同一の構成を採る。

【0039】

図4は、制御装置400の構成を示すブロック図である。

【0040】

制御装置400は、通信処理部401と、位置情報処理部402と、安全エリア処理部403と、電源処理部404と、制御部405とから主に構成されている。

【0041】

通信処理部401は、携帯電話ネットワーク300に接続されて通信を行う。位置情報処理部402は、携帯端末装置100と携帯端末装置200の位置情報を処理する。安全エリア処理部403は、携帯端末装置100にて設定された安全エリア情報を処理する。電源処理部404は、携帯端末装置200の電源のON/OFFを識別する。制御部405は、危険通知システム全体を制御する。

【0042】

次に、本危険通知システムの動作について、図5に示すフロー図を用いて説明する。

【0043】

携帯端末装置100の危険通知設定部204に対して設定が行われると、危険通知モードに切り替わる(S501)。この時点で、制御装置400に対して、危険通知モードに切り替わったことを通知する。次に、携帯端末装置100のユーザが安全エリアの設定を行う。この情報も、制御装置400に対して通知が行われる(S502)。

【0044】

また、携帯端末装置200の危険通知設定部303に対して設定が行われると、危険通知モードに切り替わる(S503)。ここで、仮に携帯端末装置200のユーザが設定を行わない場合は、この危険通知システムは作動しない。携帯端末装置200のユーザが、危険通知システムを作動させた場合は、情報が制御装置400に発信され、危険通知システムが作動を始める。

【0045】

制御装置400では、位置情報処理部402において、携帯端末装置200の位置情報を常時把握する。また、安全エリア処理部403において、携帯端末装置100から出力された安全エリア情報を蓄積する。位置情報処理部402と安全エリア処理部403のデータを照合し、携帯端末200が安全エリア外に出た(S504)、位置移動が設定時間以上無い(S505)、もしくは携帯端末装置100との距離が設定距離を超えた(S506)、などの情報を制御部405で処理し通信処理部401を通じて携帯端末装置100に通報する(S508)。通報する場合、携帯端末装置100以外への通報も設定により可能とする。また、携帯端末装置200の電源がOFFになった場合(S507)にも、電源処理部404で情報を蓄積し、制御部405、通信処理部401を通じて携帯端末装置100に通報する(S508)。

【0046】

以上のように、本実施の形態によれば、携帯端末装置が設定した安全エリアを携帯端末装置が出た場合や、携帯端末装置の電源がOFFになった場合に、直ちに携帯端末装置に通報することにより、迅速に危険を察知する危険通知システムを提供することができる。

【産業上の利用可能性】

【0047】

本発明は、携帯端末装置が設定したエリアの外に携帯端末装置が出た場合や携帯端末装置の電源がOFFされた場合に、直ちに携帯端末装置に通報が届くことで、危険を迅速に察知することができる。

【図面の簡単な説明】

【0048】

【図1】本発明の一実施の形態に係る通信システムを示すブロック図

【図2】携帯端末装置の構成を示すブロック図

【図3】携帯端末装置の構成を示すブロック図

【図4】制御装置の構成を示すブロック図

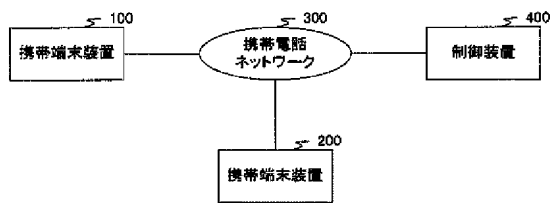
【図5】本危険通知システムの動作を示すフロー図

【符号の説明】

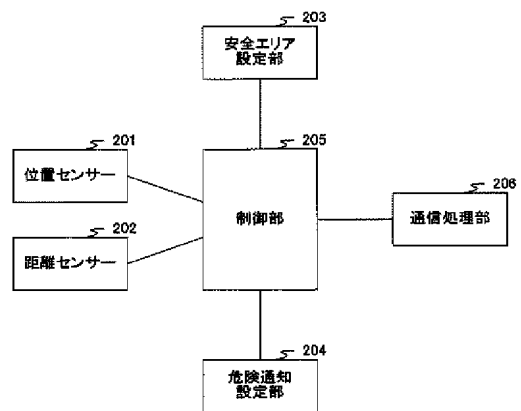
【0049】

- 100 携帯端末装置
- 200 携帯端末装置
- 201 位置センサー
- 202 距離センサー
- 203 安全エリア設定部
- 204 危険通知設定部
- 205 制御部
- 206 通信処理部
- 300 携帯電話ネットワーク
- 301 位置センサー
- 302 距離センサー
- 303 危険通知設定部
- 304 制御部
- 305 通信処理部
- 400 制御装置
- 401 通信処理部
- 402 位置情報処理部
- 403 安全エリア処理部
- 404 電源処理部
- 405 制御部

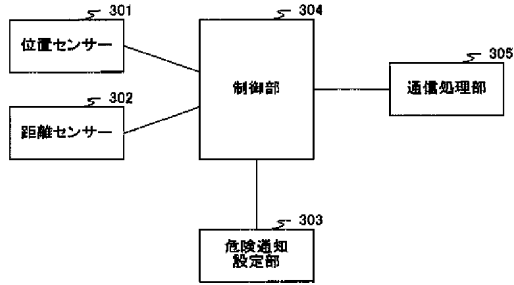
【図1】



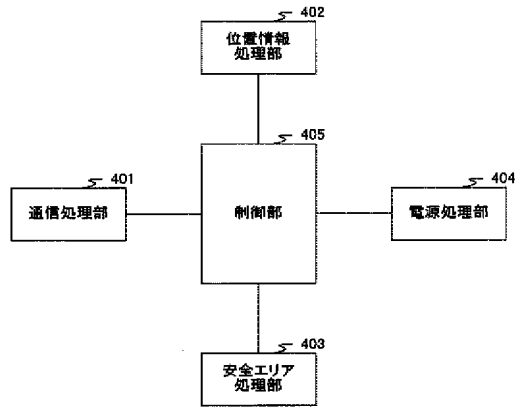
【図2】



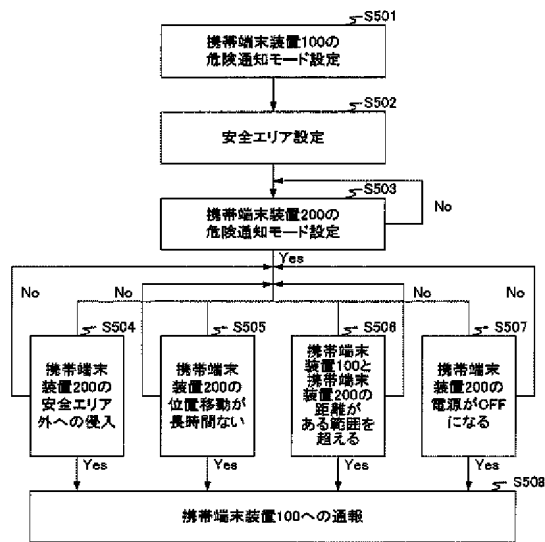
【図3】



【図4】



【図5】



(51)Int.Cl.<sup>7</sup>  
H04Q 7/38

F I  
H04B 7/26 109M

テーマコード (参考)

(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2005-223436

(P2005-223436A)

(43) 公開日 平成17年8月18日 (2005.8.18)

(51) Int. Cl. <sup>7</sup>

F 1

テーマコード (参考)

H04Q 7/34

H04B 7/26 106A

5K067

H04B 7/26

H04M 11/00 302

5K101

H04M 11/00

H04B 7/26 A

審査請求 未請求 請求項の数 10 O L (全 24 頁)

(21) 出願番号 特願2004-27002 (P2004-27002)  
(22) 出願日 平成16年2月3日 (2004.2.3)

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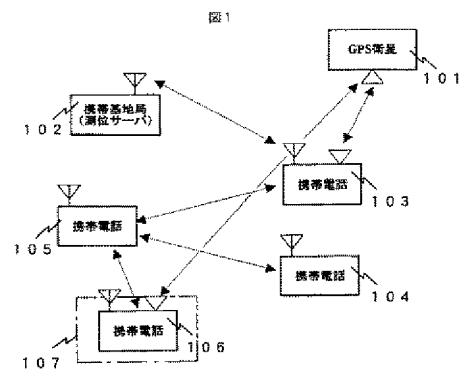
(54) 【発明の名称】 携帯端末及び位置情報交換システム

(57) 【要約】

【課題】 GPS機能を使用しなくとも、また、GPS機能を備えていなくとも、通信料金を不要として、自己位置を推定可能とする。

【解決手段】 携帯電話機103~104は、GPS機能を備えていても、備えていなくともよい。店舗などの特定の位置107の携帯端末106は、GPS機能で取得した自己位置の位置情報や位置精度情報を保持している。また、携帯電話機103~105や携帯端末106は、互いに位置情報を近距離無線通信する機能を備えている。いま、携帯電話機103や携帯端末106が携帯電話機105と近距離無線通信可能な範囲内にある状態で、携帯電話機105から近距離無線通信で位置情報要求信号を送信すると、これを受信した携帯電話機103や携帯端末106がその自己位置の位置情報や位置精度情報を送信し、携帯電話機105はこれらを受信して自己位置とその位置精度を算出し、自己位置を推定する。

【選択図】 図1



**【特許請求の範囲】****【請求項1】**

近隣の携帯端末と無線によって近距離通信を行なうための近距離無線通信手段と、  
該近距離無線通信手段で受信した近隣の携帯端末の位置情報を処理して自己位置を推定する自己位置推定手段と、  
該自己位置推定手段で推定された該自己位置を表わす該自己位置情報を記憶保持する保持手段と、  
近隣の携帯端末からの位置情報要求信号に回答して、該保持手段で保持している該自己位置情報を該近距離無線通信手段から送信させる応答手段と  
を備えたことを特徴とする携帯端末。

**【請求項2】**

請求項1に記載の携帯端末において、  
前記自己位置推定手段は、前記近距離無線通信手段により、前記近隣の携帯端末から、前記位置情報とともに、その位置情報の精度を表わす位置精度情報も受信して、前記自己位置情報とともに、その位置精度も推定し、  
前記保持手段は、前記自己位置推定手段で推定される前記自己位置の位置精度を表わす位置精度情報も記憶保持し、  
前記応答手段は、前記位置情報要求信号に回答して、前記保持手段に保持されている前記自己位置情報とその位置精度情報とを前記近距離無線通信手段から送信させる  
ことを特徴とする携帯端末。

**【請求項3】**

請求項1または2に記載の携帯端末において、  
GPS衛星からのGPS信号を受信する通信手段と測位サーバからの測位信号を受信する通信手段との少なくともいずれかを備えるとともに、  
該通信手段による受信信号を処理して自己位置を検出し、検出した自己位置を、前記位置情報として、前記保持手段に保持させる自己位置取得手段を備えたことを特徴とする携帯端末。

**【請求項4】**

請求項3に記載の携帯端末において、  
前記自己位置推定手段で推定される前記自己位置の位置精度が予め設定されている所定の値を超えたとき、前記自己位置取得手段により、自己位置情報を取得して前記保持手段の自己位置情報を更新することを特徴とする携帯端末。

**【請求項5】**

請求項1～4のいずれか1つに記載の携帯端末において、  
所定時間経過する毎に、移動距離を検出する移動検出手段と、  
前記保持手段に保持されている前記自己位置情報を該移動検出手段で検出した該移動距離分補正し、新たな自己位置情報として前記保持手段に保持させる自己位置情報を更新する自己位置情報補正手段と  
を設けたことを特徴とする携帯端末。

**【請求項6】**

請求項1～5のいずれか1つに記載の携帯端末において、  
表示手段を備え、  
推定された前記自己位置とその位置精度を該表示手段で画面表示することを特徴とする携帯端末。

**【請求項7】**

近隣の携帯端末間で位置情報の近距離無線通信を可能とする位置情報交換システムであって、  
該携帯端末は夫々、請求項1～6のいずれか1つに記載の携帯端末であることを特徴とする位置情報交換システム。



**【請求項8】**

請求項1～6のいずれか1つに記載の携帯端末であって、

自己の識別情報を発信元の情報とし、位置情報を要求する他の携帯端末の識別情報を発信先の情報として、位置情報要求信号に該発信先情報と該発信元情報とを付加して前記近距離無線通信手段から送信させる位置情報要求指示手段と、

前記近距離無線通信手段で受信した位置情報に付加されている発信先情報が自己の識別情報と一致するか否かを判定する判定手段と、

該判定手段による判定結果が該発信先情報が該自己の識別情報と一致しない場合、該発信先情報を付加した該位置情報を前記近距離無線通信手段を用いて送信させる再送信手段と

を備えたことを特徴とする携帯端末。

**【請求項9】**

請求項8に記載の携帯端末であって、

位置情報を要求可能な他の携帯端末の識別情報が暗号化されて登録され、かつ暗号化された識別符号を復号する復号機能を備えたカード状記録媒体を備え、

前記位置情報要求指示手段は、前記発信先情報として、該カード状記録媒体に登録されている暗号化された該識別情報を用い、

前記近距離無線通信手段で前記位置情報とともに受信される前記発信先情報は暗号化されており、該カード状記録媒体の復号機能で復号されて前記判定手段に供給されることを特徴とする携帯端末。

**【請求項10】**

近隣の携帯端末間で位置情報の近距離無線通信を可能とする位置情報交換システムにおいて、

該携帯端末は夫々、請求項8または9のいずれか1つに記載の携帯端末であって、

該携帯端末の前記近距離無線通信手段から送信された前記位置情報要求信号もしくは前記位置情報は、前記位置情報要求信号もしくは前記位置情報に付加されている前記発信先情報で指定される携帯端末まで、前記発信先情報で指定されていない互いに近隣した位置関係にある他の携帯端末を中継して、無線送信されることを特徴とする位置情報交換システム。

**【発明の詳細な説明】****【技術分野】****【0001】**

本発明は、携帯電話などの携帯端末に係り、特に、自己位置の推定を可能とした携帯端末及び位置情報交換システムに関する。

**【背景技術】****【0002】**

従来、自分の現在位置を知りたいというニーズが高く、このニーズを満たすものとして、車両に搭載されるナビゲーションシステム（カーナビゲーションシステム）でよく利用されているGPS（Global Positioning System）技術が知られている。

**【0003】**

一方、携帯電話などの携帯端末は、車両に搭載されるカーナビゲーション装置とは異なり、アンテナサイズや消費電力の制限等により、GPS搭載に向かない装置であるが、携帯電話と位置測位サーバとを連携させ、位置測位サーバ側で様々な測位支援処理を行なうAGPS（Assisted GPS）と呼ばれる技術や携帯電話ネットワークとGPSの補完的な性質を利用した技術などにより、携帯電話においても、位置情報を利用可能にすることが知られている（例えば、非特許文献1参照）。

**【0004】**

また、駅やバス停留所、主要な交差点、地下街、観光地などの所定の場所に設置された情報サービスステーションから、近距離無線通信により、携帯情報端末が位置情報を取得し、この携帯情報端末の現在位置を推定できるようにした情報サービスシステムも知られている（例えば、特許文献1参照）。

## 【0005】

これは、携帯情報端末が情報サービスステーションと10m程度の範囲で通信可能なBluetoothによる近距離通信や8m程度の範囲で通信可能な赤外線による近距離通信ができるようにしており、携帯情報端末が情報サービスステーションとBluetoothによる近距離通信が可能な10m程度のエリア内に入ると、携帯情報端末は、要求信号を情報サービスステーションに送信することにより、この情報サービスステーションからその位置情報を取得することができ、この結果、携帯情報端末の表示画面にこの情報サービスステーションの位置を中心とするBluetoothによる近距離通信が可能なエリアが地図上で表示され、このエリア内に自己の携帯情報端末が存在していることが推定できるものである。また、携帯情報端末がさらにこの情報サービスステーションに近づいて、この情報サービスステーションと赤外線通信が可能となると、これによって情報サービスステーションからその位置情報を取得することができ、これにより、携帯情報端末の表示画面には、地図上でのこの情報サービスステーションの位置がこの携帯情報端末の自己位置であることが矢印で示される。

## 【0006】

さらに、携帯電話機にGPSによって自己位置を測定する機能を持たせるとともに、Bluetooth無線装置を設け、携帯電話機同士でBluetoothによる近距離通信を可能としたシステムも提案されている（例えば、特許文献2参照）。

## 【0007】

このシステムでは、各携帯電話機でGPSによる自己位置計測を行ない、自己位置情報を保持している。発信元となる携帯電話機でユーザが所定の操作をすると、そのBluetooth無線装置から自己の電話番号、相手方の電話番号及び計測した位置情報が暗号化されて一定時間間隔で繰り返し送信される。相手方の携帯電話機では、起動している場合には、これをBluetooth無線装置で受信し、自分に対して送信されたものであることを検出すると、発信元の電話番号とその位置情報を抽出し、これを復号して表示画面に表示する。この場合、電話帳情報を有していれば、電話番号の代わりに、発信元のユーザの名前を表示するようにしてもよいし、また、自己位置とともに、発信元の位置を地図上で表示するようにしてもよい。

## 【0008】

このようにして、発信者側は相手方に自己位置を通知することができ、例えば、イベント会場などで回線同時使用者が多くて回線が混み合い、携帯電話の基地局がこれに対応できないなどのときでも、相手方に自分の位置を知らせることができ、お互いに位置の確認を容易にすることができるとするものである。

【非特許文献1】「モバイル総覧」2003 株式会社シーメディア 2002年11月28日 p.177-187

【特許文献1】特開2003-116160の図10

【特許文献2】特開2003-230173

【発明の開示】

【発明が解決しようとする課題】

## 【0009】

しかし、上記非特許文献1に記載の技術は、GPSアンテナを搭載しない携帯電話では、利用することはできないし、GPSアンテナ搭載の携帯電話であっても、測位サーバとの間でデータ通信を行なうと、通信料金が発生してしまうため、頻繁に測位を実施するのは現実的でなかった。また、携帯電話基地局の電波を受信できるが、GPS衛星からの電波を受信できない場所では、非常に大きな測位誤差が出てしまうし、携帯電話基地局の電波もGPS衛星からの電波も受信できない場所では、全く測位不能になるという問題があった。

## 【0010】

また、上記特許文献1に記載の技術では、情報サービスステーションからの位置情報を取得して利用できるように、GPSアンテナを搭載しなくとも（即ち、GPS衛星からの位置

情報を利用できなくとも)、この取得した位置情報から自己位置を推定することができるが、かかる情報サービスステーションとの10m程度の近距離通信が可能な範囲内の場所ではしか位置情報を取得することができず、この範囲からはずれると、もはや位置情報を取得することができない。このように、上記特許文献1に記載の技術では、予め決められた場所(即ち、情報サービスステーションの設置場所)でしか位置情報を取得することができず、しかも、このように位置情報を取得できる場所はユーザに知られていないものであって、いつでも、また、どこでも、ユーザが希望するときに位置情報を取得できる、というものではなかった。

【0011】

さらに、上記特許文献2に記載の技術では、近距離通信が可能な範囲内の他の携帯電話機の現在位置を示す位置情報を取得することができるが、かかる位置情報はこれを送信した他の(相手方の)携帯電話機の位置を知るために取得したものであって、これを受信(取得)した携帯電話機の位置を知るために用いられるものではない。自己位置を計測するためには、GPS衛星からの位置情報が用いられている。

【0012】

また、例えば、よく知らない町中などで同伴者とはぐれた場合、お互いに携帯電話機を所持していれば、電話を掛けることにより、互いに連絡し合うことができるが、夫々が自分の居る場所を認識できないときには、お互いに場所を知らせることができず、遇うのに手間が掛かるものであるし、また、通話料金もかかることになる。一方、上記特許文献2に記載の技術では、他の携帯電話機の位置情報を取得し、他の携帯電話機の現在位置を知ることができる。しかし、これはBluetoothなどの近距離通信可能な範囲にある携帯電話機について可能であり、近距離通信可能な範囲を外れた携帯電話機の位置を確認することができない。

【0013】

本発明の目的は、かかる問題を解決し、ユーザが希望するとき、或いは所定の時間間隔で、通信料金を必要とせずに、自己位置を認識するための位置情報や特定の相手方の位置情報を取得できるようにした携帯端末及び位置情報交換システムを提供することにある。

【0014】

本発明の他の目的は、位置情報とともに、場所にリンクした有用な情報も取得可能にした携帯端末及び位置情報交換システムを提供することにある。

【0015】

本発明のさらに他の目的は、任意の場所の位置情報を、通話料金を必要とせずに、容易に推定できるようにした携帯端末及び位置情報交換システムを提供することにある。

【課題を解決するための手段】

【0016】

上記目的を達成するために、本発明による携帯端末は、近隣の携帯端末と無線によって近距離通信を行なうための近距離無線通信手段と、近距離無線通信手段で受信した近隣の携帯端末の位置情報を処理して自己位置を推定する自己位置推定手段と、自己位置推定手段で推定された該自己位置を表わす自己位置情報を記憶保持する保持手段と、近隣の携帯端末からの位置情報要求信号に応答して、保持手段で保持している自己位置情報を近距離無線通信手段から送信させる応答手段とを備えたものである。

【0017】

そして、自己位置推定手段は、近距離無線通信手段により、近隣の携帯端末から、位置情報とともに、その位置情報の精度を表わす位置精度情報も受信して、自己位置情報とともに、その位置精度も推定し、保持手段は、自己位置推定手段で推定される自己位置の位置精度を表わす位置精度情報も記憶保持し、応答手段は、位置情報要求信号に応答して、保持手段に保持されている自己位置情報とその位置精度情報とを近距離無線通信手段から送信させるものである。

【0018】

また、GPS衛星からのGPS信号を受信する通信手段と測位サーバからの測位信号を

受信する通信手段との少なくともいずれかを備えるとともに、かかる通信手段による受信信号を処理して自己位置を検出し、検出した自己位置を、位置情報として、保持手段に保持させる自己位置取得手段を備えたものである。

【0019】

さらに、自己位置推定手段で推定される自己位置の位置精度が予め設定されている所定の値を超えたとき、自己位置取得手段により、自己位置情報を取得して保持手段の自己位置情報を更新するものである。

【0020】

さらに、所定時間経過する毎に、移動距離を検出する移動検出手段と、保持手段に保持されている自己位置情報を移動検出手段で検出した移動距離分補正し、新たな自己位置情報として保持手段に保持させる自己位置情報を更新する自己位置情報補正手段とを設けたものである。

【0021】

さらに、表示手段を備え、推定された前記自己位置とその位置精度を該表示手段で画面表示するものである。

【0022】

上記目的を達成するために、本発明は、近隣の携帯端末間で位置情報の近距離無線通信を可能とする位置情報交換システムであって、これら携帯端末は夫々、上記携帯端末のいずれかであるものである。

【0023】

上記目的を達成するために、本発明による携帯端末は、上記構成の携帯端末において、自己の識別情報を発信元の情報とし、位置情報を要求する他の携帯端末の識別情報を発信先の情報として、位置情報要求信号に発信先情報と発信元情報とを付加して近距離無線通信手段から送信させる位置情報要求指示手段と、近距離無線通信手段で受信した位置情報に付加されている発信先情報が自己の識別情報と一致するか否かを判定する判定手段と、この判定手段による判定の結果、発信先情報が自己の識別情報と一致しない場合、発信先情報を付加した位置情報を近距離無線通信手段を用いて送信させる再送信手段とを備えたものである。

【0024】

また、位置情報を要求可能な他の携帯端末の識別情報が暗号化されて登録され、かつ暗号化された識別符号を復号する復号機能を備えたカード状記録媒体を備え、位置情報要求指示手段は、発信先情報として、カード状記録媒体に登録されている暗号化された識別情報を用い、近距離無線通信手段で位置情報とともに受信される発信先情報は暗号化されており、カード状記録媒体の復号機能で復号されて判定手段に供給されるものである。

【0025】

上記目的を達成するために、本発明は、近隣の携帯端末間で位置情報の近距離無線通信を可能とする位置情報交換システムであって、携帯端末は夫々、上記の再送信手段などを備えた携帯端末であり、これら携帯端末の近距離無線通信手段から送信された位置情報要求信号もしくは位置情報は、かかる位置情報要求信号もしくは位置情報に付加されている発信先情報で指定される携帯端末まで、この発信先情報で指定されていない互いに近隣の位置関係にある他の携帯端末を中継して、無線送信されるものである。

【発明の効果】

【0026】

本発明によれば、近隣の携帯端末同士で位置情報や位置精度情報のやり取りを可能とし、取得した位置情報や位置精度情報を用いて自己位置や位置精度を求めるものであるから、GPS機能や測位サーバを利用することなく、従って、通信料金を掛けずに、いちでも、また、どこでも、自己位置を推定することが可能になる。

【0027】

また、近距離通信を利用して携帯端末同士でネットワークを構築し、該ネットワークを利用して携帯端末間の通信を可能とするものであるから、所定の携帯端末の位置情報など

を該ネットワークを介して取得することが可能となり、通信料金を掛けずに、他の携帯端末の位置を直接目で確認することができる。

【発明を実施するための最良の形態】

【0028】

以下、本発明の実施形態を図面を用いて説明する。

なお、以下の実施形態では、ユーザが携帯して使用する携帯端末を携帯電話機として説明するが、PDAなどの他の携帯端末であってもよい。

【0029】

図1は本発明による位置情報交換システムの第1の実施形態を示す図であって、101はGPS衛星、102は携帯基地局、103～105は携帯電話機、106は携帯端末、107は特定場所である。

【0030】

同図において、GPS衛星101は、地球上空を周回しながら、携帯端末などで位置情報を検出させるためのGPS信号を送出している。また、携帯基地局102は、携帯電話システムの回線制御を行なって、携帯電話機間のデータ通信や携帯電話機をインターネットなどに接続して携帯電話機とサーバとの通信を行なわせるものであるが、測位サーバも備えており、この測位サーバがGPS衛星101と連動して携帯電話機の位置検出をサポートする。

【0031】

携帯電話機103～105は個人（ユーザ）が携帯して使用するものであり、携帯端末106は商店などの決められた特定の場所107に設置されているものとする。そして、これら携帯電話機103～105や携帯端末106は、お互いに位置情報の近距離無線通信ができるものである。なお、近距離無線通信とは、Bluetoothなどによる通信であって、その通信可能範囲は10m程度である。

【0032】

携帯電話機103～105は、GPS衛星101からのGPS信号を受信して自己位置を検出する機能（以下、GPS機能という）を有しても、有しなくてもよいし、測位サーバからの信号を受信して自己位置を検出する機能（以下、測位サーバ機能という）。また、GPS機能、測位サーバ機能のいずれかを備えたものであってもよい。しかし、携帯端末106は、その近距離無線通信が可能な範囲を通過する携帯電話機（ここでは、携帯電話機103～105）にその位置情報を提供することを目的とするものであって、高い位置精度の位置情報を提供するために、GPS機能を有しており、これで検出した自己位置の位置情報（以下、自己位置情報という）を携帯電話機103～105に提供するものである。なお、ここでは、携帯電話機103はGPS機能を備えており、携帯電話機104、105はGPS機能を備えていないものとする。

【0033】

図2は図1に示す実施形態に用いる本発明による携帯端末（携帯電話機）の実施形態の内部構成を示すものであって、図2（a）はGPS機能も備えた場合を示し、図2（b）はGPS機能を備えていない場合を示し、図2（c）は、携帯端末106のように、特定の場所に設置される携帯端末を示すものである。なお、図2（a）～（c）において、201は制御部、202は音声入出力部、203は記憶部、204は操作部、205は表示部、206は基地局通信部、207は加速度センサ、208は振動センサ、209はGPS通信部、210は近距離通信部であり、同一符号のものは同一機能を有するものである。

【0034】

図1に示す携帯電話機103～105としては、図2（a）に示す構成をなしているものであってもよいが、図2（b）に示す構成をなしているものでよい。しかし、ここでは、携帯電話機103、105は図2（a）に示す構成をなし、携帯電話機104は図2（b）に示す構成をなしているものとする。また、携帯端末106は図2（c）に示す構成をなしているものとするが、図2（a）または図2（b）に示す構成をなしているものでよい。

## 【0035】

図2(a)に示す携帯電話機103, 105は、従来の携帯電話機と同様、必要なプログラムやデータを保持し、各種判定や演算などを基に装置全体の統括制御を行なう制御部201、音声通話を行なうためのマイクロホンやスピーカといった音声入出力部202、この携帯電話機103の利用者(以下、ユーザという)による各種設定情報やダウンロードしたデータ、後述の位置データ、プログラムなどを保存する記憶部203、操作キーなどを備えて入力操作を行なうための入力部204、電話番号情報やインターネットのコンテンツ情報、GPS信号や他の携帯端末から取得した位置情報などを表示する表示部205及び携帯基地局102(図1)と音声通信(通話)やデータ通信を行なうための基地局通信部206を備えているが、さらに、GPS衛星101(図1)からのGPS信号を受信するためのGPS通信部209や他の携帯電話機などと近距離無線通信を行なうための近距離通信部210、携帯電話機105の加速度を検出する加速度センサ207、携帯電話機105の振動を検出する振動センサ208を備えている。加速センサ207や振動センサ208は、制御部201とともに、携帯電話機103, 105の移動量を検出するための手段(即ち、移動検出手段)であって、これら制御部201や近距離通信部210、加速センサ207、振動センサ208は、携帯電話機103の電源がオフ状態にあっても、稼働状態にある。

## 【0036】

かかる携帯電話機103, 105において、通話やデータ通信は、制御部201の制御の基に、音声入出力部202や記憶部203、入力部204、表示部205、基地局通信部206を用いて、従来の携帯電話機と同様に行なわれるものであり、ここでは、説明を省略する。

## 【0037】

GPS機能を利用してGPS衛星101(図1)からのGPS信号から位置情報を取得する場合(即ち、GPS機能を利用する場合)には、この携帯電話機103, 105のユーザが入力部204で所定の位置情報要求操作をすると、制御部201の制御の基にGPS通信部209が稼働し、このGPS通信部209でGPS信号を受信する。受信したこのGPS信号は制御部201で処理されてこの携帯電話機103, 105の現在位置が自己位置として高精度で得られ、この自己位置を表わす位置情報が、後述する他の情報(以下、付加情報という)とともに、位置データとして記憶部203に記憶される。また、これとともに、制御部201は、検出されたこの自己位置の位置情報を基に、記憶部203に保存されている地図情報を読み取り、また、この記憶部203に必要な地図情報がない場合には、基地局通信部206から図示しないサーバに地図情報を要求し、このサーバからこの地図情報を取得する。かかる地図情報は、検出された上記の位置情報とともに、表示部205に供給され、これにより、地図上にこの携帯電話機103, 105の自己位置が表示される。

## 【0038】

また、上記のように、近距離通信部210は、携帯電話機103の電源がオフ状態にあっても、近距離無線通信が可能な状態にある。そして、制御部201は、予め決められた所定時間が経過する毎に自動的に、この近距離通信部210から位置情報の要求信号を送信する。この位置情報要求信号の送信に応答して、この携帯電話機103と近距離無線通信可能な範囲内にある(即ち、近隣の)他の携帯電話機からその現在位置を示す位置情報や付加情報が送信され、それが近距離通信部210で受信される。制御部201は、この受信された位置情報や付加情報から自己位置(即ち、この携帯電話機103の位置)を求め、この自己位置を表わす位置情報は、同様にして得られた付加情報とともに、位置データとして記憶部203に記憶される。

## 【0039】

この記憶部203には、上記のGPS機能、測位サーバ機能あるいは近距離無線通信によって取得した位置情報などから求めた自己位置や付加情報の位置データが記憶されており、上記のようにして新たな位置データが得られると、これによって記憶部203の位置

データが更新されることになる。

【0040】

加速センサ207は、携帯電話機103の加速度を検出する。制御部201はこの検出した加速度から携帯電話機103、105の移動距離を算出し、記憶部203に記憶されている位置情報を読み出してこの位置情報の自己位置をこの移動距離で修正し、新たな自己位置の位置情報として記憶部203の位置情報を更新する。この場合、移動方向は、GPS機能や測位サーバ機能、近距離無線通信で得られた自己位置とそれ以前の同様にして得られた自己位置とから推定される。例えば、1つ前のGPS機能や測位サーバ機能、近距離無線通信で得られた自己位置に対して今回の同様にして得られた自己位置が北方向に位置すると推定されると、携帯電話機103、105は北方向に移動しているものと推定される。そして、GPS機能や測位サーバ機能、近距離無線通信によって今回得られた自己位置からは、加速センサ207の検出出力によって移動距離による自己位置の修正が、北方向に移動するように、行なわれることになる。そして、次のGPS機能や測位サーバ、近距離無線通信によって自己位置の位置情報が得られるまで、加速センサ207から移動距離が繰り返し得られ、自己位置が順次北方向に移っていくことになる。

【0041】

なお、振動センサ208は携帯電話機103の振動を検出するものであって、この検出された振動により、制御部201が携帯電話機103が移動しているものと判定する。この制御部201は、このように携帯電話機103が移動しているものと判定しているとき、携帯電話機103の自己位置を加速センサ207の検出出力で求めた移動距離分修正する。

【0042】

図2(b)に示す構成の携帯電話機104は、GPS機能を備えていないので、GPS通信部209(図2(a))を備えていない。このため、近距離通信部210を用いて所定時間経過毎に自動的に他の携帯電話機から位置情報などを取得し、上記のように、自己位置を推定する。また、他の携帯電話機から次の位置情報などを取得するまで、加速センサ207や振動センサ208の検出出力を用いて、上記のように、自己位置を修正していくことも、図2(a)に示す構成の携帯電話機103、105と同様である。

【0043】

図2(c)に示す構成の携帯端末106は、店舗などの特定の場所107に備え置かれるものであって、GPS通信部209や基地局通信部206、近距離通信部210を備えている。GPS通信部209は、自己位置を高精度を取得するために、GPS信号を利用できるようにするためのものであり、受信したGPS信号から取得した自己位置の位置情報が記憶部203に記憶される。また、近距離通信部210は他の携帯端末と位置データの近距離無線通信を可能とするものであり、位置情報を要求するユーザの携帯電話機に、記憶部203に記憶されている位置情報や後述する位置関連情報などを提供するものである。かかる携帯端末106では、移動しないため、自己位置の修正のための加速センサ207や振動センサ208を必要としない。また、通話機能を必要としない場合には、音声入出力部202も省くこともできる。

【0044】

かかる携帯端末106では、GPS信号から求めた自己位置が付加情報とともに、位置データとして記憶部203に格納されている。この付加情報には、後述するように、この携帯端末106の設置位置107に関連した情報(即ち、上記の位置関連情報)があるが、かかる情報は入力部204から入力される。

【0045】

また、この携帯端末106においても、GPS機能によって得られた自己位置の位置情報をもとに、記憶部203に記憶されている地図情報や基地局通信部206で取得した地図情報とGPS機能による位置情報とから表示部205で地図上に自己位置を表示させ、自己位置を確認することができるようにしている。

【0046】

なお、この携帯端末106でのGPS機能は、入力部204での所定操作により、稼働してGPS信号から位置情報を検出し、これを記憶部203に記憶するが、あるいは携帯端末106の電源のオン時に稼働させるようにすることもできる。但し、GPS機能が稼働しても、GPS信号から自己位置を検出し、これで記憶部203の位置情報を更新するだけであり、表示部205での表示は行なわれない。自己位置を表示部205で表示させるためには、上記のように、入力部204で所定の操作をしなければならない。

【0047】

図3(a)は図2(a)、(b)における記憶部203に記憶される位置データの一具体例を示す図である。

【0048】

この位置データ300aは、図示するように、位置情報301と位置精度情報302と位置情報更新日時情報303とからなっており、これら位置精度情報302と位置情報更新日時情報303とが、位置情報301に対する付加情報である。位置情報301は、この記憶部203を内蔵する携帯電話機103～105の自己位置を示すものであって、GPS機能や測位サーバ機能、近距離無線通信によって得られた情報、もしくはかかる情報を加速センサ207の検出出力から得られた移動距離で修正したものであり、例えば、緯度、経度で表わされる。位置精度情報302はこの位置情報301の精度を表わすものであって、誤差範囲で表現され、位置情報301がGPS信号から得られたものであるときには、高精度であるため、0mとし、近距離無線通信で他の携帯電話機や携帯端末から得られる位置情報や位置精度情報から求めたものであるときには、例えば、誤差範囲が近距離無線通信の可能範囲とする場合、10mとする。位置情報更新日時情報303は、GPS機能や測位サーバ機能、近距離無線通信によって得られた情報を基に新たに得られた位置データで記憶部203を更新した日時を表わすものである。

【0049】

図3(b)は図2(a)、(b)における記憶部203に記憶される位置データの他の具体例を示す図である。

【0050】

この位置データ300bは、携帯電話機103～105が特定の場所107に設置された携帯端末106から近距離無線通信で取得した情報を基に得られたものであって、図3(a)に示す位置データ300aに位置関連情報304が付加されたものである。この位置関連情報304は、携帯端末106が設置されている店舗などの施設に関する情報であって、例えば、設置場所107が店舗である場合には、客を引き付けるための情報(例えば、割引チケット)とすることができる。

【0051】

携帯端末106の記憶部203(図2(c))にも、同様の位置データ300bが格納されており、携帯電話機103～105から位置情報の要求があると、かかる位置データ300bのうちの位置情報301と位置精度情報302と位置関連情報304とが、近距離通信部210により、要求があった携帯電話機に送信される。この場合、位置情報301はGPS機能によって得られたものであるから、位置精度情報302は0mとなっている。

【0052】

次に、図2(a)に示す構成の携帯電話機105が近距離無線通信によって得られた情報でもって自己位置を検出する場合を例にして、この実施形態の動作について説明する。図4はこの動作の一具体例を示すフローチャートである。

【0053】

同図において、ユーザが入力部204で所定の位置要求操作をすることにより、あるいは位置情報の要求が自動的に行なわれるものであって、かかる位置情報の要求があると、自己位置検出動作の開始を指令する(S(ステップ)400)。これにより、制御部201は位置情報要求信号を生成し、これに自分(携帯電話機105)のID(識別符号)を付加して近距離通信部210から送信して、位置情報を要求する(S401)。この要求



に対して、近距離無線通信が可能な範囲内にある他のユーザ使用の携帯電話機103, 104あるいは特定位置107に設置された携帯端末106から位置情報とその位置精度情報などの付加情報とが送信されると、これが近距離通信部210で受信される(S402, 403)。受信されたこれら情報は制御部201で処理されて(携帯電話機105の)自己位置とその位置精度とが算出され(S404)、算出されたこの自己位置を表わす位置情報とこの位置精度を表わす位置精度情報と位置情報更新日時情報、さらに、携帯端末106から位置情報や位置精度情報を受信したときには、そのとき受信する位置関連情報も含めて位置データとし、この新たな位置データで記憶部203の位置データが更新される(S405, 406)。

**【0054】**

ここで、上記のように、ユーザが入力部204で操作して位置情報の要求をしたものであるときには、このように算出された自己位置とその位置精度(さらには、位置関連情報)が表示部205で表示される(S407)。

**【0055】**

一方、制御部201は、常時加速度センサ207で検出される携帯電話機105の加速度を取り込んでおり、記憶部203で位置データの更新が行なわれると、この取り込んで加速度を用いてこの更新時点からこの携帯電話機105の移動距離を順次算出していく(S408)。そして、記憶部203で位置データの更新が行なわれた時点から予め決められた時間が経過すると、記憶部203から位置情報を読み取り(S409)、この位置情報の自己位置にこの時点での移動距離を加算し、この時点での携帯電話機105の新たな自己位置を求める。この場合、先に説明したようにして、携帯電話機105の移動方向を求め、この移動方向に移動距離が加算されて新たな自己位置が求められる(S404)。そして、この求めた自己位置を新たな位置情報として、記憶部203で位置情報の新たな更新が行なわれる(S405)。なお、このように算出された移動距離を基に記憶部203での自己位置が更新される場合には、位置精度情報は近距離無線通信で取得した情報を基に求めた位置精度情報がそのまま更新されずに記憶部203に記憶保持される。即ち、S406の更新は行なわれない。

**【0056】**

このようにして、近距離無線通信で取得した情報を基に記憶部203で位置データの更新が行なわれた後には、近距離無線通信による次の同様の更新が行われるまで、加速度センサ207の検出出力を用いて求めた移動距離による位置情報の更新動作、即ち、S408→S404→S405→S408……の動作が上記の予め決められた時間が経過する毎に繰り返される。

**【0057】**

そして、その後、ユーザが入力部204で所定の位置情報要求操作をすることにより、あるいは位置情報の要求が自動的に行なわれるものであって、その位置情報要求のタイミングとなると、再びS401から動作が開始される。

**【0058】**

ここで、他の携帯電話機から取得した情報に基づく自己位置と位置精度の推定方法の一具体例について説明する。

**【0059】**

いま、携帯電話機105が携帯電話機103, 104, 106のいずれか1つのみ(ここでは、携帯電話機103とする)から位置情報などを取得したものとし、携帯電話機103でこの位置情報がGPS信号から得られた高精度(位置精度情報=0m)のものであるとすると、図5(a)に示すように、携帯電話機103の近距離通話可能な範囲500内に携帯電話機105が存在することになるから、携帯電話機105の自己位置を携帯電話機103から得られた位置情報が表わす位置( $N_1, E_1$ )とし(これは、携帯電話機103の自己位置である)、その位置精度を携帯電話機103の近距離無線通信可能な範囲500の半径R(Bluetoothによる近距離無線通信の場合、10m程度)とする。従って、記憶部203では、位置情報が( $N_1, E_1$ )に更新され、位置精度情報がR(m)に更

新される。

【0060】

また、携帯電話機105が2つの携帯電話機(例えば、携帯電話機103, 104)から位置情報などを取得した場合には、図5(b)に示すように、携帯電話機103の半径 $R_1$ の近距離無線通信可能な範囲501と携帯電話機104の半径 $R_2$ の近距離無線通信可能な範囲502とが重複するハッチングで示す範囲内に携帯電話機105が存在することになる。そこで、この場合には、近距離無線通信可能な範囲501, 502の外径の交点 $P_1, P_2$ の中点を携帯電話機105の自己位置( $N_0, E_0$ )と推定し、また、この自己位置を中心とし、このハッチング範囲に外接する半径 $R_0$ の範囲503をこの自己位置に対する位置精度と推定する。換言すれば、ハッチングの範囲に外接する円がこの携帯電話機105の位置制度を表わし、この円の中心位置をこの携帯電話機105の自己位置と推定するものである。

【0061】

ここで、携帯電話機103, 104の近距離無線通信可能な範囲501, 502を夫々半径が $R_1, R_2$ の円形とし、携帯電話機103, 104の位置( $N_1, E_1$ )、( $N_2, E_2$ )間の距離を $r$ とした場合の携帯電話機105の自己位置、位置精度について説明する。

【0062】

なお、近距離通信可能な範囲の大きさは、全ての携帯電話機や携帯端末で等しく設定されているが、上記の半径 $R_1, R_2$ は、位置精度も考慮したものである。

【0063】

例えば、携帯電話機103から近距離無線通信で位置情報( $N_1, E_1$ )と位置精度情報( $\Delta R$ )とを受信したとすると、この携帯電話機103は位置( $N_1, E_1$ )を中心とする半径 $\Delta R$ の円内に存在することになるから、携帯電話機の実際の近距離通信可能な範囲を半径 $R$ の円内とすると、この位置精度 $\Delta R$ を加味した場合、この携帯電話機103の近距離無線通信可能な範囲を、図6に示すように、位置( $N_1, E_1$ )を中心とする半径 $R' = (R + \Delta R)$ の円601内と仮想する。図5(b)における携帯電話機103, 104の近距離通信可能範囲 $R_1, R_2$ は、このように、夫々の位置精度も考慮した仮想的な近距離通信可能範囲(以下、仮想近距離通信可能範囲という)であって、その大きさは位置精度に応じて異なることになる。従って、GPS機能によって得られた位置精度は0mであるから、このときの仮想近距離通信可能範囲は、実際の近距離通信可能範囲と同じ大きさの半径 $R$ の円内となる。図5(c)の場合も同様である。

【0064】

そこで、図5(b)において、仮想近距離通信可能範囲501の半径 $R_1$ の外円と仮想近距離通信可能範囲502の半径 $R_2$ の外円との交点 $P_1, P_2$ を通る直線は携帯電話機103, 104の位置( $N_1, E_1$ )、( $N_2, E_2$ )を通る直線に直交するから、位置( $N_1, E_1$ )、( $N_0, E_0$ )間の距離 $A$ と位置( $N_0, E_0$ )、( $N_2, E_2$ )間の距離 $B$ は夫々、

【数1】

$$R_1^2 - A^2 = R_2^2 - B^2$$

$$\text{但し、} A + B = r$$

【0065】

であり、

【数2】

$$A = \frac{r^2 + (R_1^2 - R_2^2)}{2r} \quad B = \frac{r^2 - (R_1^2 - R_2^2)}{2r}$$

【0066】

である。そこで、携帯電話機105の求められる自己位置( $N_0$ ,  $E_0$ )は、

【数3】

$$\begin{aligned} N_0 &= N_2 - (N_2 - N_1) \cdot \frac{B}{r} \\ &= \frac{r^2 - (R_1^2 - R_2^2)}{2r^2} \cdot N_1 + \frac{r^2 + (R_1^2 - R_2^2)}{2r^2} \cdot N_2 \end{aligned}$$

$$\begin{aligned} E_0 &= E_2 - (E_2 - E_1) \cdot \frac{A}{r} \\ &= \frac{r^2 - (R_1^2 - R_2^2)}{2r^2} \cdot E_1 + \frac{r^2 + (R_1^2 - R_2^2)}{2r^2} \cdot E_2 \end{aligned}$$

【0067】

で表わされる。

【0068】

また、ハッチング範囲の外接円の半径 $R_0$ (即ち、携帯電話機105の位置精度)は、上記の数1, 数2から、

【数4】

$$\begin{aligned} R_0 &= \sqrt{R_1^2 - A^2} = \frac{\sqrt{(2rR_1)^2 - \{r^2 + (R_1^2 - R_2^2)\}^2}}{2r} \\ &= \sqrt{R_2^2 - B^2} = \frac{\sqrt{(2rR_2)^2 - \{r^2 - (R_1^2 - R_2^2)\}^2}}{2r} \end{aligned}$$

【0069】

で表わされる。

【0070】

そこで、一例として、携帯電話機103, 104からの位置精度情報も0mであって、

携帯電話機103, 104の仮近距離通信可能範囲の大きさが実際の近距離通信可能範囲の大きさが等しく、ともに半径Rの円とすると、 $R_1=R_2=R$ として、携帯電話機105の自己位置( $N_0, E_0$ )は、上記数3により、

$$N_0 = (N_1 + N_2) / 2$$

$$E_0 = (E_1 + E_2) / 2$$

であるから、携帯電話機103, 104間の中点であり、また、携帯電話機105の位置精度は、上記数4により、

【数5】

$$R_0 = \sqrt{R^2 - (r/2)^2}$$

【0071】

となる。

【0072】

また、携帯電話機105が3つの携帯電話機(例えば、携帯電話機103, 104, 106)から位置情報などを取得した場合には、同様に、図5(c)に示すように、これら携帯電話機103, 104, 106の近距離無線通信可能範囲501, 502, 504が重複するハッチングで示す範囲内に携帯電話機105が存在するものと推定する。この場合の携帯電話機105の自己位置は、このハッチング範囲に外接する円503を設定し、この外接円の中心位置と推定し、また、この自己位置の位置精度をこの外接円の半径 $R_0$ とする。4以上の携帯電話機から位置情報を取得して自己位置やその位置精度を求め方法も、これと同様である。

【0073】

ところで、このように位置精度情報も加味して自己位置やその位置精度を求めると、得られた位置精度が近距離無線通信の可能範囲の大きさを超えて大きくなる場合もある。そこで、この実施形態では、GPS機能を備えている場合、得られた位置精度が、この近距離無線通信可能範囲の大きさを超えて、予め決められた閾値(上限値)を超えたときには、自動的にGPS機能を稼働させ、GPS信号から自己位置を求めて、位置データとして、記憶部203に記憶するようにすることもできる。例えば、かかる閾値を12mとし、近距離無線通信可能範囲Rが10mとして、携帯電話機103のみから、図6に示すように、( $N_1, E_1$ )の位置情報と位置精度 $\Delta R$ が5mの位置精度情報が受信されたとすると、これによって推定される自己位置は( $N_1, E_1$ )であるが、その位置精度は $R + \Delta R = 15m$ となり、閾値(=12m)を超えてしまうことになる。そこで、この場合には、GPS機能を起動し、受信したGPS信号から自己位置の位置情報を取得するようにする。

【0074】

図7は図2に示す表示部205での自己位置の表示画面を模式的に示す図である。

【0075】

同図において、表示画面700には、地図が表示され、この地図上に上記のようにして求めた自己位置のマーク701と上記のようにして求めた位置精度に応じた自己位置の誤差範囲702とが表示される。この誤差範囲702は、自己位置マーク701を中心とし、位置精度を半径とする円で表わされ、この円状の誤差範囲702内に自己位置、即ち、携帯電話機105が存在するものと推定されるものである。

【0076】

また、この表示画面700には、「近距離通信」の表示703がなされて近距離無線通信による自己位置表示の画面であることが知らされ、また、この場合の位置精度704も、「誤差10m」などとして表示され。

【0077】

図4に示す動作は、図1での携帯電話機105について説明したものであるが、ユーザが携帯して使用する他の携帯電話機においても行なわれるものである。従って、図1に示

す携帯電話機103, 104においても、図4に示す動作を行なって他の携帯電話機から近距離無線通信によって位置情報などを取得することができる。また、ユーザが携帯して使用する携帯電話機は、他の携帯電話機から位置情報の要求も受け付け、これに回答して位置情報や位置精度情報などの付加情報を送信する。図4の説明では、携帯電話機103や携帯電話機104が、携帯電話機105からの位置情報要求に対し、位置情報や位置精度情報をこの携帯電話機105に提供したものであり、携帯電話機105も、同様にして、他の携帯電話機に対して、位置情報などを提供できるものである。

【0078】

各携帯電話機は、他の携帯電話機に位置情報を要求するときには、図4に示す動作を行なうものであるが、このように位置情報の要求をしないときには、他の携帯電話機からの位置情報の要求待ち状態になっている。これを、図1及び図2(a)に示す携帯電話機103を例にして、図8を用いて説明する。

【0079】

同図において、S800は図4でのS400～S403の動作に相当し、S801, S802, S803, S804は夫々図4でのS408, S409, S404, S405に相当する。即ち、携帯電話機103は、GPS信号や近距離無線通信によって他の携帯電話機から位置情報などを取得するまでは(S800)、加速度センサ207の検出結果を読み取って移動距離を算出し(S801)、記憶部203から位置情報を読み取って(S802)、これら移動距離と位置情報とから自己位置を算出し(S803)、このようにして得られた自己位置で記憶部203の位置情報を更新する(S804)、という一連の動作が繰り返されており、この待機期間中に他の携帯電話機からの位置情報の要求を待つ状態にある(S805)。

【0080】

近距離通信部210で他の携帯電話機、例えば、携帯電話機105から位置情報の要求信号を受信すると(S805)、制御部201は、これに回答して、貴オブ203から位置情報を読み出し(S806)、また、位置精度情報を読み出して(S807)、要求があった携帯電話機105に送信する。そして、また、S801からの動作を繰り返し、次の位置情報要求信号を待つ状態に戻る。

【0081】

なお、図1及び図2(c)に示す携帯端末106の場合には、位置情報や位置精度情報に加えて(S806, S807)、図3(b)に示す位置関連情報も記憶部203から読み出して送信する。

【0082】

なお、ここでは、図2(a)に示すように、GPS機能を備えた携帯電話機105が近距離通信可能な近隣の他の携帯電話機103, 104の位置情報や位置精度情報を用いて自己の位置及び位置精度を求めるものであったが、GPS機能を持たない携帯電話機104も、同様にして、近距離通信可能な近隣の他の携帯電話機103, 105の位置情報や位置精度情報を用いて自己の位置及び位置精度を求めることもできることはいうまでもない。

【0083】

以上のようにして、GPS機能を用いることなく、あるいはGPS機能を備えていなくとも、通信料金を不要として、いつでも、また、どこでも、位置情報などを取得することができ、自己位置を推定することが可能となる。

【0084】

図9は本発明による位置情報交換システムの第2の実施形態を示す図であって、901～904は携帯端末である。なお、ここでは、携帯端末901～904を携帯電話機とするが、携帯電話機901を、特に、位置情報端末と呼ぶ場合もある。

【0085】

同図において、携帯電話機901～904は、図1での携帯電話機103～105と同様の機能を有するが、この実施形態では、さらに、携帯電話機901～904同士が近距

離無線通信機能で1つのネットワークを構成し、このネットワークにより、後述する登録した同士の携帯電話機間で位置情報の通信を可能としたものである。例えば、携帯電話機901と携帯電話機904が同じ家族の構成員が使用するものとする、互いに登録し合っており、携帯電話機901、904同士が直接近距離無線通信不能な位置関係にあっても、携帯電話機901と近距離無線通信可能な範囲内に携帯電話機902が存在し、また、携帯電話機902と近距離無線通信可能な範囲内に携帯電話機903が存在し、さらに、携帯電話機903と近距離無線通信が可能な範囲内にこの携帯電話機904が存在している場合には、携帯電話機901から携帯電話機902、903を中継して携帯電話機904と通信可能なネットワークを構成できる。

【0086】

そこで、携帯電話機901～904がかかる位置関係にあるとき、携帯電話機901からこの携帯電話機901に登録されている携帯電話機904に位置情報を要求すると、この携帯電話機901から送信される位置情報要求信号は携帯電話機902、903を中継して携帯電話機904に送信される。携帯電話機904は、この位置情報要求信号を受信すると、これにตอบสนองして自己位置の位置情報と位置精度情報を含む応答信号が携帯電話機902、903を中継して携帯電話機901に送信する。携帯電話機901では、受信したこれら情報を表示部で表示することにより、携帯電話機904の自己位置を知ることができる。

【0087】

かかる構成によると、互いに登録し合っている複数の携帯電話機のうちの1つ、例えば、携帯電話機901で携帯電話機904などの全ての登録携帯電話機の位置を一括して管理するようにすることもできる。このような位置管理を行なう携帯電話機901が位置情報端末と呼ばれるものであり、ここで、全ての登録携帯電話機の位置を知ることができる。従って、例えば、位置情報端末901を自宅に設置しておき、家族構成員にこの位置情報端末901に登録されている携帯電話を携帯させることにより、自宅に居ながらにして、通話することなく、各家族構成員の居場所を直接知ることができる。この場合、この家族構成員は、極端な場合として、現在の居場所が判らなくともよい。

【0088】

なお、勿論、家族の構成員同士で、その携帯する携帯電話機を用いて互いの居場所を、同様に、確認することができるようにすることもできる。

【0089】

図10は図9における携帯電話機901の一実施例の内部構成を示すブロック図であって、211はICカードであり、図2(a)に対応する部分には同一符号を付けて重複する説明を省略する。

【0090】

同図において、携帯電話機901は、図2(a)または図2(b)に示す携帯電話機103、105の構成にICカード211を加えた構成をなしているが、ここでは、図2(a)に示す構成にICカード211を加えた構成をなしているものとする。なお、ICカード211は着脱可能である。

【0091】

かかる構成において、制御部201は、図2(a)に示す制御部201と同様、これを内蔵する携帯電話機901と近距離無線通信可能な他の任意の携帯電話機に位置情報などを要求し、これによって取得した位置情報などから自己位置とその位置精度を求める機能を有するとともに、上記のように、登録されている携帯電話機を指定してその位置情報などを要求し、これを取得する機能も有している。また、記憶部203は、図2(a)に示す制御部201と同様、近距離無線通信で取得した位置情報などから求めた自己位置の位置情報やその付加情報からなる位置データを記憶するとともに、上記のように、指定した登録携帯電話機から取得した位置情報なども記憶する。

【0092】

また、ICカード211には、各登録携帯電話機のID(識別符号)が、セキュリティ

を保つために、暗号化されて格納されており、また、記憶部203には、登録携帯電話機に関する情報（そのユーザの氏名などの登録端末情報）のリスト（登録端末情報リスト）と、これら登録端末情報とICカード211内での暗号化されたIDとを対応付けるテーブル（登録端末情報／ID対応付テーブル）も格納されている。さらに、ICカード211には、近距離通信部210で受信した暗号化IDを復号する復号プログラムも格納されている。

**【0093】**

なお、記憶部203には、携帯電話機901自身のID（以下、自己IDという）も格納されているが、かかる自己IDは暗号化されたものと暗号化されないものと格納されている。制御部201は、近距離通信部210で受信されてICカード211で復号されて受信IDを記憶部203に格納されている暗号化されていない自己IDと比較し、これらが一致しているか否かを判定する機能なども備えている。

**【0094】**

次に、携帯電話機901から携帯電話機902、903を中継して登録している携帯電話機904の位置情報などを取得する動作について説明する。なお、ここでは、携帯電話機902、903も、携帯電話機901と同様、図10に示す構成をなしているものとする。

**【0095】**

いま、携帯電話機901のユーザ（位置情報要求側ユーザ）が携帯電話機904のユーザ（相手側ユーザ）の居場所を知りたい場合、この位置情報要求側ユーザが携帯電話機901の入力部204を操作して携帯電話機904を指定する。これは、入力部204を所定操作することにより、記憶部203に格納されている指定可能な相手側を示す登録端末情報リストを読み出して表示部205に表示させ、そのうちの希望する相手側を指定操作することによって行なわれる。相手側が指定されると、記憶部203に格納されている登録端末情報／ID対応付テーブルを基に、ICカード211に格納されている相手側の暗号化IDのうちの該当する暗号化IDが発信先IDとして選択されて読み取られ、これに発信元IDとしての暗号化された自己IDと位置情報要求コードが付加されて位置情報要求信号が形成され、近距離通信部210から送信される。

**【0096】**

この送信信号は、携帯電話機901と近距離無線通信可能な範囲内の携帯電話機902で受信されるが、この携帯電話機902の動作を図10によって説明すると、制御部201は、近距離通信部210で受信された位置情報要求信号の発信先IDと発信元IDと位置情報要求コードを夫々識別して、この受信信号が自分（携帯電話機902）が発信したものではない位置情報要求信号であることを判別する。かかる判定により、受信した位置情報要求信号は記憶部203に一時記憶され、また、この発信先IDがICカード211で復号されて記憶部203に格納されている暗号化されていない自己IDと比較される。この場合、復号された発信先IDはこの携帯電話機902の自己IDと一致しないから、制御部201は記憶部203に記憶した位置情報要求信号を読み出し、近距離通信部210から他の携帯電話機に送信する。この送信信号は、携帯電話機902と近距離無線通信可能な範囲内にある携帯電話機903で受信されるが、この携帯電話機903でも、携帯電話機902と同様に、受信した発信先IDが自己IDと一致しないので、この受信した位置情報要求信号とを近距離通信部210から送信する。

**【0097】**

なお、携帯電話機902からの送信信号は、また、携帯電話機901でも受信されるが、この携帯電話機901では、この受信した位置要求信号の発信元IDが自己IDと一致するので、自分が発信したものとして、この位置情報要求信号を破棄する。

**【0098】**

また、携帯電話機903からの送信信号は、携帯電話機902でも受信されるが、例えば、携帯電話機902は携帯電話機901からの位置情報要求信号を上記のようにして送信する際、自分が中継したことを示す暗号化された自己IDを中継IDとして付加するよ

うにし、その後受信した位置情報要求信号の中継IDが自己IDに一致したときには、この位置情報要求信号は既に中継したものであるものと判定して破棄するようにする。勿論、この場合、携帯電話機902からのかかる中継IDを含む位置情報要求信号を受信した携帯電話機903は、この位置情報要求信号を送信する際には、中継したことを示すために、携帯電話機902の中継IDを含む位置情報要求信号に、さらに、自己（携帯電話機903）の暗号化されたIDを中継IDとして付加する。このようにして、位置情報要求信号を中継する携帯電話機は、受信して送信する位置情報要求信号に自己IDを中継IDとして付加するものであるから、その後受信した位置情報要求信号に自己IDと等しい中継IDが含まれているか否かによって一度中継した位置情報要求信号であるか否かを判定することができ、一度中継したものであれば、破棄するようにする。なお、位置情報要求信号に付加する中継IDの個数（例えば、2個）は限られており、限られた個数を越える携帯電話機を中継する場合には、古い順に中継IDを消去していく。このようにして、位置情報要求信号が発信元側に戻らず、近距離無線通信で携帯電話機を順に中継するしていくことになる。

**【0099】**

携帯電話機903からの送信信号は携帯電話機901が指定した携帯電話機904で受信される。この携帯電話機904では、図10を基に説明すると、上記の携帯電話機902、903と同様、近距離通信部210で受信された位置情報要求信号の各IDや位置情報要求コードなどを識別して記憶部203に記憶し、また、発信先IDはICカードで復号される。この復号された発信先IDは制御部201で記憶部203に記憶されている暗号化されていない自己IDと比較されるが、これらIDは一致するので、制御部201はこの位置情報要求信号が自分（携帯電話機904）の位置情報を要求しているものと判定する。

**【0100】**

そこで、制御部201は、受信した位置情報要求信号での発信元IDを発信先（相手側）ID、発信先IDを発信元（自己）IDとし、これら発信先、発信元IDに記憶部203に記憶されている応答コードと自己の位置情報、位置精度情報を付加して位置情報応答信号を作成し、近距離通信部210から送信する。この位置情報応答信号は、上記の位置情報要求信号と同様にして、携帯電話機903、902を中継して位置情報を要求した携帯電話機901に送られる。なお、この場合も、携帯電話機903、902で中継IDが用いられ、位置情報応答信号が携帯電話機903、902を順に中継していく。

**【0101】**

携帯電話機901では、図10を基に説明すると、近距離通信部210でこの位置情報応答信号が受信されると、この位置情報応答信号の発信先、発信元IDや応答コード、位置情報、位置精度情報が識別されて記憶部203に記憶されるとともに、発信先IDがICカード211で復号されて記憶部203の暗号化されていない自己IDと比較される。この場合、発信先IDと自己IDとが一致し、この比較結果と位置情報応答信号での応答コードとから、制御部201は、この受信信号が自分（携帯電話機901）に対する位置情報応答信号であるものと判定する。そこで、制御部201は、記憶部203の位置情報応答信号の発信元IDをICカード211で復号し、この復号した発信IDを基に記憶部203に記憶されている登録端末情報リストから相手側情報（例えば、相手側（携帯電話機904のユーザ））を選択し、この相手側情報と関連付けてこの位置情報応答信号の位置情報や位置精度情報を位置データとして記憶部203に記憶する。そして、この位置リストの情報は読み出され、表示部205に表示される。これにより、携帯電話機901のユーザは、携帯電話機904の位置（従って、そのユーザの位置）を画面で知ることができる。

**【0102】**

図11は記憶部203に記憶された登録携帯電話機の位置データの具体例を模式的に示す図である。

**【0103】**



同図において、ここでは、携帯電話機901に4個の携帯電話機が登録されており、夫々のIDをID0, ID1, ID2, ID3としている。そして、各登録携帯電話機毎に位置データ1000が記憶されるが、かかる位置データ1000は、その携帯電話機から上記のようにして取得した位置情報と位置精度情報と、さらに、これらを取得して記憶部203に記憶した日時を表わす位置情報更新日時情報とから構成されている。

【0104】

図12はかかる位置データ1000の表示例を示す図である。

【0105】

入力部204(図10)で位置データの表示指令操作をすると、記憶部203(図10)から各登録携帯電話機の位置データ1000が読み出され、図12に示すように、表示部205(図10)の表示部205の表示画面1100で、地図上にID0, ID1, ID2, ID3の各登録携帯電話機の位置とその位置精度とが、図7と同様の方法で、表示される。

【0106】

なお、図12では、全ての登録携帯電話機の位置や位置精度が同時に表示されるものとしたが、ユーザが希望する特定の登録携帯電話機を指定することにより、その登録携帯電話機の位置、位置精度のみを地図上に表示することもできる。

【0107】

また、上記のように、希望する所定の登録携帯電話機の位置情報を要求した場合には、この指定した登録携帯電話機の位置情報及び位置精度情報を取得したとき、自動的にこの登録携帯電話機の位置及び位置精度が、図12に示すように、表示画面1100で地図上に表示される。また、上記では、希望する1つの登録携帯電話機904を指定してその位置情報を要求したが、複数の登録携帯電話機を同時に指定してそれらの位置情報を要求することもでき、この場合には、これらの位置情報及び位置精度情報を取得すると、これらによる位置及び位置精度が同時に、図12に示すように、表示される。

【0108】

以上のようにして、この第2の実施形態では、近距離無線通信可能な範囲外にある携帯電話機でも、相手方との通話を行なうことなく、従って、通信料金を不要として、相手方の位置を直接目で確認することができる。

【0109】

なお、図9に示す第2の実施形態では、各携帯電話機901~904が図10に示す構成としたが、図2(b)に示す構成にICカード211が付加され、図10に示す構成の場合と同様の機能を持つものであってもよい。

【0110】

以上では、ユーザが利用する携帯電話機間では、位置情報そのものを交換することを中心に説明してきたが、位置情報そのものだけでなく、位置情報に関連したデータをやりとりするようにすることもできる。基本的には、位置情報のやりとりと同様の手順で実現できるが、位置情報要求信号の送信時に、位置情報に関連する他のデータも同時に要求すればよいし、要求された携帯電話機も、これに回答して関連するデータを送信すればよい。勿論、携帯電話機には、位置情報に関連するデータを格納する手段が必要となる。

【0111】

さらに、上記の関連する情報が、特定の場所にいる場合にのみやりとり可能な属性が付く場合も考えられ得る。例えば、位置関連情報が利用可能な属性として東経・西経の範囲を指定していれば、携帯電話機は、自己位置情報を確認し、その指定された範囲内に在るときにのみデータを送信すればよい。また、逆に、受信側でデータを受信したとき、自己位置情報と比較してこれを受信しても良いどうかの判断を行なってもよい。さらに、より特別な情報である場合には、位置情報の緯度・経度をもとに生成する値を鍵データとして、位置関連情報を暗号化しておくことにより、よりデータを厳密に管理することも可能である。

【0112】

また、遊園地のような入口と出口とが設けられた施設で利用する場合には、入口のゲートを通じた際に、携帯電話機を位置関連情報の送受信可能なモードに入り、出口のゲートを通じた際に、位置関連情報の送受信不可モードになるようにすることにより、毎回データの送受信時に測位を行わなくても、あるエリアに限定した情報のやりとりが可能になる。

【図面の簡単な説明】

【0113】

【図1】本発明による位置情報交換システムの第1の実施形態を示す構成図である。

【図2】図1に示す携帯端末の一実施形態を示すブロック図である。

【図3】図2における記憶部に記憶される位置データの具体例を模式的に示す図である。

【図4】図2(a)、(b)に示す携帯端末の他の携帯端末からの位置データにより自己の位置データを推定する場合の動作の一具体例を示すフローチャートである。

【図5】図4での自己位置、位置精度の推定方法の一具体例を説明するための図である。

【図6】位置精度が0mでない場合の仮想的な近距離通信範囲を模式的に示す図である。

【図7】図4に示す動作で得られた自己位置と位置精度の表示画面の一具体例を示す図である。

【図8】図2に示す携帯端末の対貴動作の一具体例を示すフローチャートである。

【図9】本発明による位置情報交換システムの第2の実施形態を示す構成図である。

【図10】図9に示す携帯端末の一実施形態を示すブロック図である。

【図11】図9に示す携帯端末で取得した他の携帯端末の位置データの具体例を模式的に示す図である。

【図12】図11に示す位置データの表示例を示す図である。

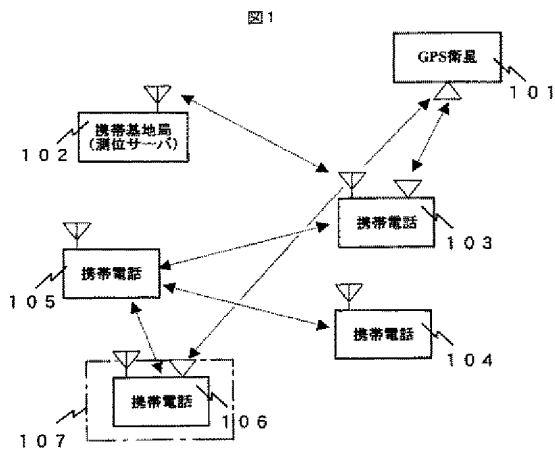
【符号の説明】

【0114】

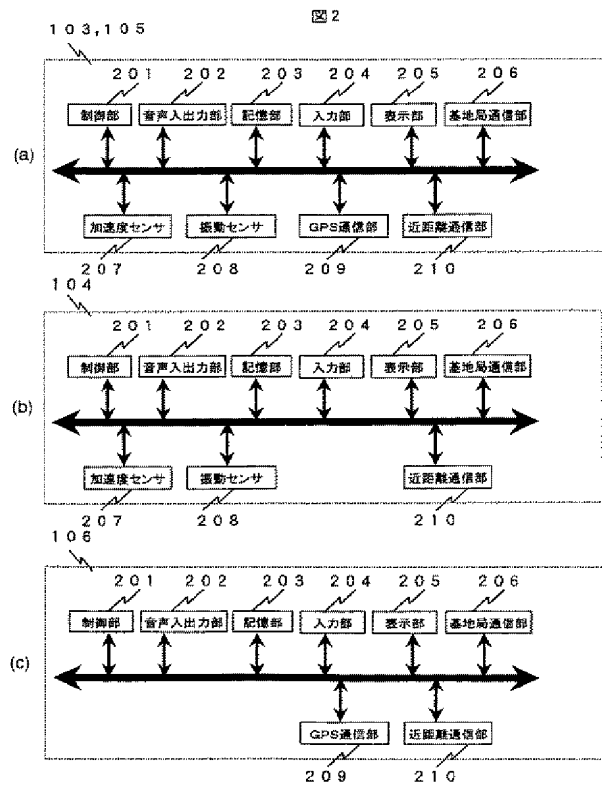
- 101 GPS衛星
- 102 携帯基地局(測位サーバ)
- 103~105 携帯電話機
- 106 携帯端末
- 107 特定の場所
- 201 制御部
- 202 音声入出力部
- 203 記憶部
- 204 入力部
- 205 表示部
- 206 基地局通信部
- 207 加速度センサ
- 208 振動センサ
- 209 GPS通信部
- 210 近距離通信部
- 211 ICカード
- 300a, 300b 位置データ
- 500~504 位置精度
- 601 仮想近距離通信可能範囲
- 700 表示画面
- 701 自己位置
- 702 誤差範囲
- 703 「近距離通信」の表示
- 704 位置精度の表示
- 901~904 携帯電話機
- 1000 位置データ

1 1 0 0 表示画面

【図1】



【図2】



【図3】

図 3

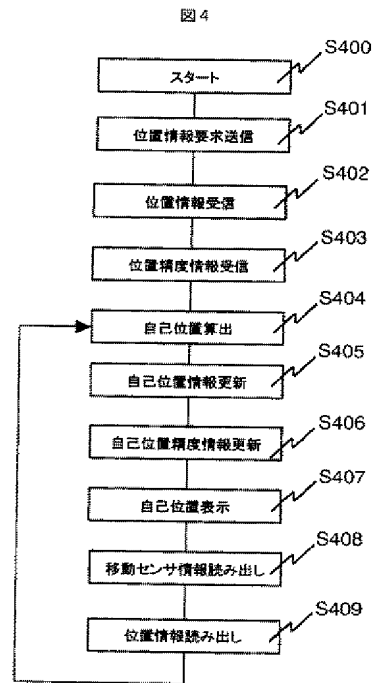
(a)

項目	データ
位置情報	N35.11.22.33, E140.11.22.33
位置精度情報	10m
位置情報更新日時	2003.10.10, 10:15:30

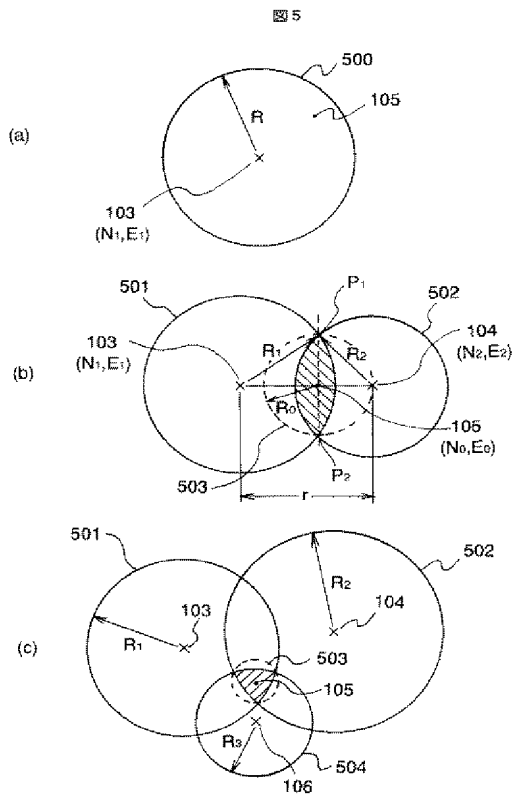
(b)

項目	データ
位置情報	N35.11.22.33, E140.11.22.33
位置精度情報	10m
位置情報更新日時	2003.10.10, 10:15:30
位置関連情報	割引チケットA

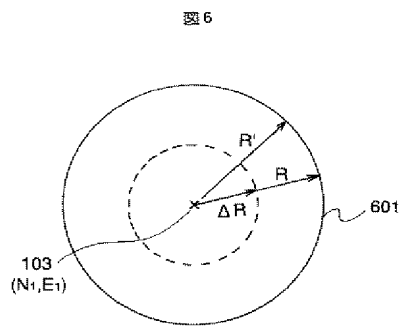
【図4】



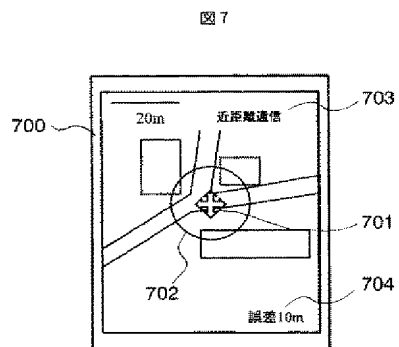
【図5】



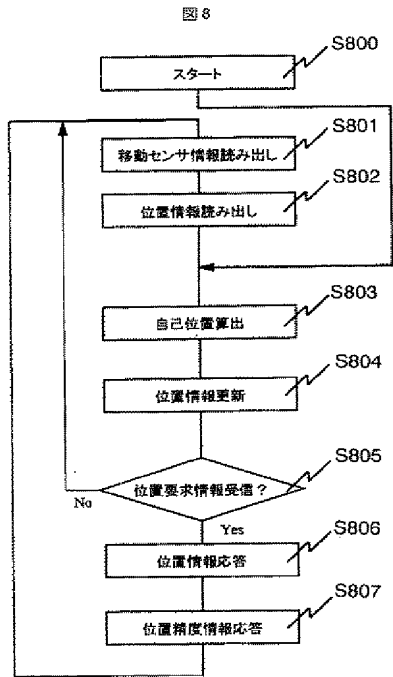
【図6】



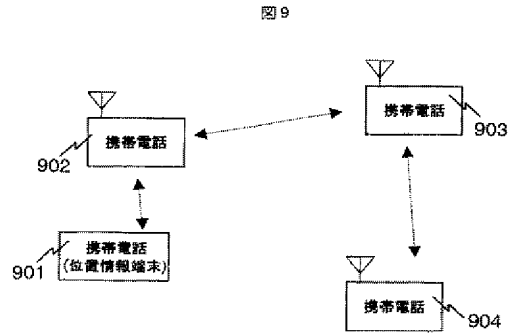
【図7】



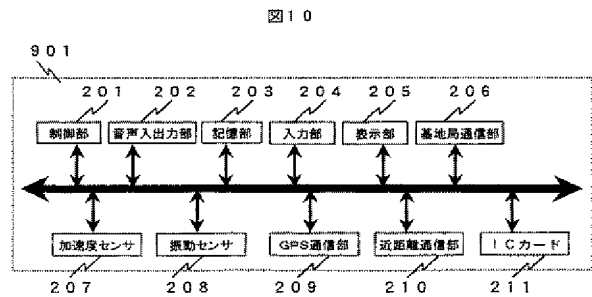
【図8】



【図9】



【図10】



【図11】

図11

項目	データ			
	ID0	ID1	ID2	ID3
登録端末ID	ID0	ID1	ID2	ID3
位置情報	位置0	位置1	位置2	位置3
位置精度情報	位置精度0	位置精度1	位置精度2	位置精度3
位置情報更新日時	日時0	日時1	日時2	日時3

1000

複数携帯端末位置データ

【図12】

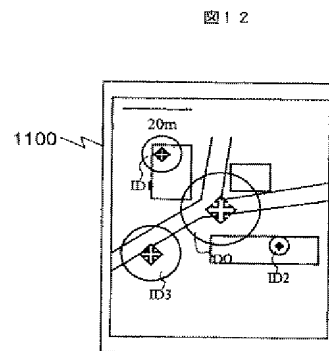


図12

F ターム(参考) 5K067 AA21 BB21 DD17 DD20 DD51 EE02 EE06 EE10 EE35 EE37  
FF03 FF06 FF23 HH22 HH23 HH24 HH28 HH36 JJ52 JJ56  
KK15  
5K101 KK00 LL12 NN18

## WO0163315

Publication Title:

REMOTE-TO-REMOTE POSITION LOCATING SYSTEM

Abstract:

A position locating system (20) includes one or more target monitoring devices (22) that are configured to monitor and display the position of one or more selected target devices (24), which may include one or more selected target monitoring devices (22). The target monitoring devices (22) and target devices (24) communicate through a wireless communication network (26) with a data processing system (28), such as a data center, that receives and stores geographic position data and other data transmitted from the target devices (24), and also preferably from the target monitoring devices (22).; The position of a selected target device (24) is preferably displayed on a display (30) of the target monitoring device (22) as at least one of a distance between the target monitoring device (22) and the selected target device (24), a compass direction from the target monitoring device (22) to the selected target device (24) in degrees from magnetic North, a relative compass heading from the target monitoring device (22) to the selected target device (24), and/or the nearest geographical address of the selected target device (24) which is derived from a GEO-Coded Address (GCA) database preferably maintained at the data processing system (28).

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Courtesy of <http://worldwide.espacenet.com>

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
30 August 2001 (30.08.2001)

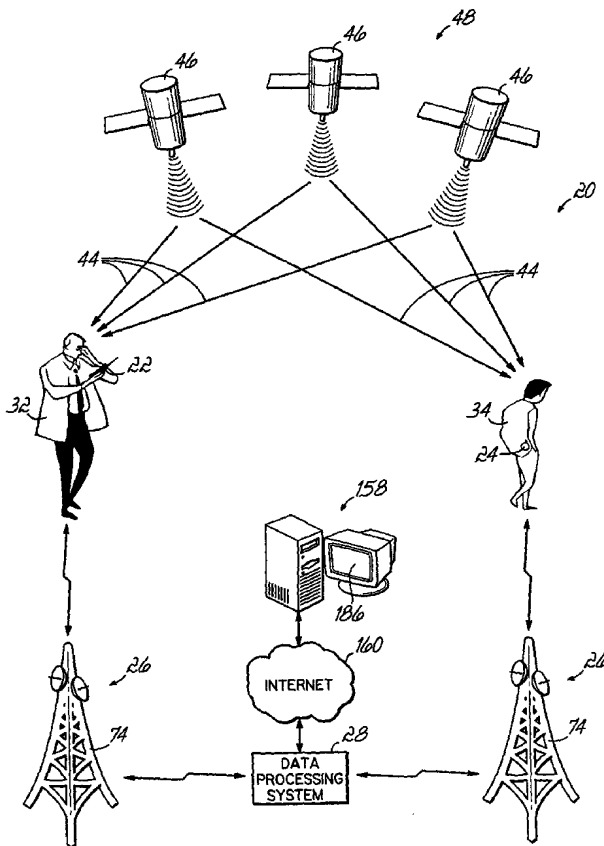
(10) International Publication Number  
PCT  
WO 01/63315 A2

- (51) International Patent Classification<sup>7</sup>: G01S 5/02
- (21) International Application Number: PCT/US01/05681
- (22) International Filing Date: 23 February 2001 (23.02.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
 

60/184,248	23 February 2000 (23.02.2000)	US
09/791,132	22 February 2001 (22.02.2001)	US
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- (74) Agents: BRINKMAN, David, H. et al.; Wood, Herron & Evans, L.L.P., 2700 Carew Tower, Cincinnati, OH 45202 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: REMOTE-TO-REMOTE POSITION LOCATING SYSTEM



(57) Abstract: A position locating system (20) includes one or more target monitoring devices (22) that are configured to monitor and display the position of one or more selected target devices (24), which may include one or more selected target monitoring devices (22). The target monitoring devices (22) and target devices (24) communicate through a wireless communication network (26) with a data processing system (28), such as a data center, that receives and stores geographic position data and other data transmitted from the target devices (24), and also preferably from the target monitoring devices (22). The position of a selected target device (24) is preferably displayed on a display (30) of the target monitoring device (22) as at least one of a distance between the target monitoring device (22) and the selected target device (24), a compass direction from the target monitoring device (22) to the selected target device (24) in degrees from magnetic North, a relative compass heading from the target monitoring device (22) to the selected target device (24), and/or the nearest geographical address of the selected target device (24) which is derived from a GEO-Coded Address (GCA) database preferably maintained at the data processing system (28).



WO 01/63315 A2





**Published:**

— without international search report and to be republished upon receipt of that report

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

**REMOTE-TO-REMOTE POSITION LOCATING SYSTEM**

The present application claims the filing benefit of U.S. Provisional Application No. 60/184,248, filed February 23, 2000, the disclosure of which is hereby incorporated herein by reference in its entirety.

**Field of the Invention**

5           The present invention relates generally to tracking and monitoring systems and, more particularly, to a position locating system for enabling the location of a person or object to be monitored and displayed.

**Background of the Invention**

10           Many different systems and approaches have been developed in the past to enable the location of a person or object to be monitored and displayed. Generally, these systems and approaches can be classified as either requiring direct data communication between a device being monitored and a monitoring device or, alternatively, direct data communication between the device being monitored and a central monitoring station.

15           For example, several position location or monitoring systems are known that include monitored devices and monitoring devices that communicate directly with each other through a wireless media, such as through radio (RF) signals. By way of example, the monitored device, such as carried by a child, may transmit a radio signal that is monitored by the monitoring device, such as carried by a parent. In the event the signal received by the parent's monitoring device falls below a predetermined signal strength, the monitoring device transmits a signal to the  
20           *child's monitored device to activate an alarm and/or an alarm is activated on the parent's* monitoring device. The monitoring device may include an antenna array that is capable of determining the angle of propagation of the radio signal from the child's monitored device so that the relative direction of the child can be determined and displayed.

25           Other monitoring and locating systems have been developed in the past wherein each of the monitored and monitoring devices includes a position determination circuit, such as a GPS receiver and GPS processor, so that the latitude and longitude coordinates of the monitored and monitoring devices can be determined. The monitored and monitoring devices have wireless communication capability so that the monitored device transmits its geographic coordinates to the monitoring device. The monitoring device uses its own derived geographic position data, and the  
30           geographic position data transmitted by the monitored device, to derive the distance and direction between the two devices.

35           Further, monitoring and locating systems have been developed in the past wherein the monitored device transmits its geographic location to a central monitoring station where that information can be displayed. The monitored device may include a GPS receiver and GPS processor so that the latitude and longitude coordinates of the monitored device can be determined and transmitted to the central monitoring station. The central monitoring station may include a GEO-Coded Address database so that the position of the monitored device can be displayed on a map.

While these various approaches for monitoring the location of persons or objects may be suitable for the particular purpose to which they address, they suffer from several shortcomings and drawbacks. For example, those approaches that require direct communication between the monitored device and the monitoring device are not well suited for tracking or monitoring applications that require a significant distance separation between the monitored and monitored devices so that direct communication between the devices is not possible. Without an established communication link between the two devices, the monitoring device simply cannot monitor the position of the monitored device. Moreover, those approaches that require direct communication between the monitored device and a central monitoring station are not suited for applications that require a portable monitoring device to track and monitor the position of a monitored device.

Accordingly, there is a need for an improved position tracking and monitoring system and approach that does not require direct communication between a monitored device and a monitoring device to permit the monitoring device to monitor and display the location of the monitored device. There is also a need for an improved position tracking and monitoring system and approach that more effectively uses the position data generated by the monitored device for tracking and monitoring purposes.

#### **Summary of The Invention**

The present invention overcomes the foregoing and other shortcomings and drawbacks of position locating systems and methods of monitoring and displaying the location of a person or object heretofore known. While the invention will be described in connection with certain embodiments, it will be understood that the invention is not limited to these embodiments. On the contrary, the invention includes all alternatives, modifications and equivalents as may be included within the spirit and scope of the present invention.

In accordance with the principles of the present invention, a position locating system includes one or more target monitoring devices that are configured to monitor and display the position of one or more selected target devices, which may include one or more selected target monitoring devices. The target monitoring devices and target devices communicate through a wireless communication network with a data processing system, such as a data center, that receives and stores geographic position data and other data transmitted from the target devices, and also preferably from the target monitoring devices.

The position of a selected target device is preferably displayed on a display of the target monitoring device as at least one of a distance between the target monitoring device and the selected target device, a compass direction from the target monitoring device to the selected target device in degrees from magnetic North, a relative compass heading from the target monitoring device to the selected target device, and/or the nearest geographical address of the selected target device which is derived from a GEO-Coded Address (GCA) database preferably maintained at the data processing system.

In one embodiment of the present invention, the target devices, and preferably also the target monitoring devices, are configured to receive signals from satellites of the Global Positioning System (GPS). The target devices and target monitoring devices preferably include GPS receivers and GPS processors from which the geographic positions, in latitude and longitude  
5 coordinates, of the target devices and target monitoring devices can be derived. Each of the target monitoring devices and the target devices preferably includes a wireless communication circuit that is operable to transmit the derived geographic coordinates of the respective target monitoring device and target device to the data processing system through the wireless communication network. The target monitoring devices preferably include a compass circuit that  
10 is operable to derive the present compass heading of the target monitor device in degrees from magnetic North. Preferably, the target monitoring device is further operable to transmit the compass heading of the device to the data processing system.

In operation of the position locating system of the present invention, a user of the target monitoring device is able to select one of several target devices that are listed on a pre-  
15 programmed menu displayed on the target monitoring device and request the location of that selected target device. In response to the received request, the data processing system evaluates the last known locations of the target monitoring device and the selected target device to establish data that represents the distance between the target monitoring device and the target device, the compass direction from the target monitoring device to the target device in degrees  
20 from magnetic North, and the nearest geographic address of the target device. In the event the target monitoring device includes a compass circuit that has transmitted the compass heading of the target monitoring device in degrees from magnetic North, the data processing system uses the compass heading of the target monitoring device and the derived compass direction from the target monitoring device to the target device in degrees from magnetic North to establish data  
25 that represents a relative compass heading from the target monitoring device to the target device. The data processing system is preferably operable to transmit through the wireless communication network at least one, and preferably all of the distance, compass direction, relative compass heading, and nearest geographic address data to the target monitoring device for display.

30 Alternatively, the wireless communication network may include position location circuits that are operable to determine the locations of the target monitoring devices and the target devices from wireless signals transmitted by the devices. The position location circuits may use various algorithms known to those of ordinary skill in the art, such as time difference or arrival, angle of arrival, enhanced observed time difference or multi-path finger printing, to derive  
35 the geographic locations, such as latitude and longitude, of the target monitoring devices and the target devices from the wireless signals transmitted by the devices. The position location circuits are coupled to the data processing system and apply data representing the derived geographic locations of the target monitoring devices and the target devices to the data processing system for processing.

The above features and advantages of the present invention will be better understood with reference to the accompanying figures and detailed description. It will also be understood that the particular drawings illustrating the invention are exemplary only and are not to be regarded as limitations of the invention.

5 **Brief Description of the Drawings**

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with a general description of the invention given above, and the detailed description of the embodiments given below, serve to explain the principles of the invention.

10 Fig. 1A is a schematic view of a position locating system in accordance with one embodiment of the present invention;

Fig. 1B is a view similar to Fig. 1A illustrating a position locating system in accordance with an alternative embodiment of the present invention;

15 Fig. 1C is a block diagram illustrating data transfer in the position locating systems of Figs. 1A and 1B;

Fig. 2 is a schematic view illustrating data transfer in an exemplary embodiment of the position locating system of Fig. 1A;

20 Fig. 3 is a front elevational view of a target monitoring device and an exemplary display of the target monitoring device in accordance with one embodiment of the present invention, illustrating the target monitoring device as a wireless phone;

Figs. 3A-3F are additional exemplary displays of the target monitoring device of Fig. 3;

Fig. 4 is a front elevational view of a target device in accordance with one embodiment of the present invention;

25 Fig. 5 is a rear elevational view of the target device of Fig. 4;

Fig. 6 is a block diagram of the target monitoring device of Fig. 3 in accordance with one embodiment of the present invention;

Fig. 7 is a block diagram of the target device of Figs. 4-5 in accordance with one embodiment of the present invention;

30 Fig. 8 is a perspective view of a target monitoring device or a target device in accordance with an alternative embodiment of the present invention, illustrating the target monitoring device or the target device as a wrist-worn watch;

35 Fig. 9 is a top elevational view of a target monitoring device or a target device in accordance with another alternative embodiment of the present invention, illustrating the target monitoring device or the target device as a wrist-worn watch;

Fig. 10 is a side elevational view of the target monitoring device or the target device of Fig. 9;

Fig. 11 is a side elevational view of a target monitoring device or a target device in accordance with an yet another alternative embodiment of the present invention, illustrating the target monitoring device or the target device as a wrist-worn watch;

Fig. 12 is a front elevational view of a computer display in accordance with the principles of the present invention;

Fig. 13 is view similar to Fig. 1A illustrating a position locating system in accordance with yet another alternative embodiment of the present invention;

Fig. 14A is a diagrammatic view illustrating an exemplary compass heading of a target monitoring device in degrees from magnetic North and an exemplary compass direction from the target monitoring device to a target device in degrees from magnetic North;

Fig. 14B is a diagrammatic view illustrating an exemplary relative compass heading from the target monitoring device to the target device, illustrated as a graphical vector;

Fig. 15A is a view similar to Fig. 14A illustrating a further exemplary compass heading of a target monitoring device in degrees from magnetic North and a further exemplary compass direction from the target monitoring device to a target device in degrees from magnetic North;

Fig. 15B is a view similar to Fig. 14B illustrating a further exemplary relative compass heading from the target monitoring device to the target device, illustrated as a graphical vector;

Fig. 16A is a view similar to Fig. 3 illustrating yet another exemplary display of the target monitoring device of Fig. 3; and

Fig. 16B is a view similar to Figs. 3A-3F illustrating still yet another exemplary display of the target monitoring device of Fig. 3.

#### **Detailed Description of the Preferred Embodiment**

With reference to the Figures, and to Fig. 1A in particular, a position locating system 20 in accordance with one embodiment of the present invention is shown. As will be described in greater detail below, position locating system 20 includes one or more target monitoring devices 22 that are configured to monitor and display the position of one or more selected target devices 24, which may include other selected target monitoring devices 22. As used herein, it will be understood that a target monitoring device 22 is considered to be a "target" device when the position of that target monitoring device 22 is requested by another target monitoring device 22 as described in detail below. The target monitoring devices 22 and target devices 24 communicate through a wireless communication network 26 with a data processing system 28, such as a data center, that receives and stores geographic position data and other data transmitted from the target devices 24 and preferably also from the target monitoring devices 22 as will be described in greater detail below.

The position of a selected target device 24 is preferably displayed on a display 30 of the target monitoring device 22 as at least one of a distance between the target monitoring device 22 and the selected target device 24, a compass direction from the target monitoring

device 22 to the selected target device 24 in degrees from magnetic North, a relative compass heading from the target monitoring device 22 to the selected target device 24, and/or the nearest geographical address of the selected target device 24 which is derived from a GEO-Coded Address (GCA) database preferably maintained at the data processing system 28.

5                   When used in person-to-person position locating applications as shown in Fig. 1A, the target monitoring devices 22 and the target devices 24 are preferably sized and configured to be easily carried or worn by individuals 32 and 34, such as by a parent and a child, respectively. Additionally, the target devices 24 may be placed on pets (not shown) or in objects such as  
10 vehicles (not shown) or luggage (not shown) so that the location of the pet or object can be monitored and displayed in accordance with the principles of the present invention. As will be described in greater detail below, the target monitoring devices 22 may be implemented within a wireless telephone 36, as shown in Fig. 3 for example, or alternatively, within a wrist-worn watch device 38a, 38b and 38c, as shown in Figs. 8-11 for example. In alternative embodiments of the present invention, the target monitoring devices 22 may be implemented in pagers, personal data  
15 assistants (PDA's), Internet access devices or similar wireless data processing devices having a display (not shown).

The target devices 24 may be implemented as a relatively small clip-on device that can be worn on a belt or as a device that can be easily placed within a pocket of the individual 34 (Fig. 1A), as shown in Figs. 4-5 for example. As shown in Fig. 5, a rear face 40 of the target  
20 device 24 preferably includes an aperture 42 for releasably retaining a post (not shown) associated with a belt or hip worn clip device (not shown). Alternatively, the target devices 24 may be implemented within wrist-worn device 38a, 38b and 38c as shown in Figs. 8-11, a pager, a personal data assistant (PDA), an Internet access device or a similar wireless data processing device having a display (not shown) for example. Of course, it will be appreciated that the target  
25 monitoring devices 22 and the target devices 24 may be configured in many other shapes and sizes, or be implemented in other types of devices (not shown), without departing from the spirit and scope of the present invention.

Further referring to Fig. 1A, the target monitoring devices 22 and the target devices 24 are preferably configured to receive signals 44 from satellites 46 of the Global  
30 Positioning System (GPS) 48 which comprises multiple satellites broadcasting precise timing signals 44 from atomic clocks. The target monitoring device 22 preferably includes, although not required in certain embodiments, a GPS antenna 50, GPS receiver 52 and a GPS processor 54 (Fig. 6) that use precise and well-developed triangulation formulas to determine the geographic position of the target monitoring device 22 in geographic coordinates, namely latitude and  
35 longitude, from the timing signals 44 transmitted by the GPS satellites 46. A GPS signal strength circuit 56 (Fig. 6) is preferably coupled to the GPS processor 54 for providing a visual indication (not shown) of the received GPS signal strength. Similarly, the target device 24 preferably includes a GPS antenna 58, GPS receiver 60 and a GPS processor 62 (Fig. 7) from which the geographic position of the target device 24 in latitude and longitude coordinates can be derived.

It will be appreciated that while GPS information may be preferred for deriving the geographic positions of the target monitoring devices 22 and the target devices 24, many other position information systems known to those of ordinary skill in the art are possible as well for deriving latitude and longitude coordinates of the target monitoring devices 22 and target devices 24 without departing from the spirit and scope of the present invention.

As shown in Figs. 1A and 6, the target monitoring device 22 preferably includes a processor chip 64 having a central processing unit (CPU) 66 that is operable to receive the geographic position information derived by the GPS receiver 52 and the GPS processor 54. The target monitoring device 22 further includes a wireless communication circuit, preferably comprising a DSP transmitter 68 and a DSP antenna 70 coupled to the CPU 66, that is operable to transmit the derived geographic coordinates of the target monitoring device 22 in an encrypted format, represented by position data 72 in Fig. 1C, to the data processing system 28 through cell towers 74 of the wireless communication network 26. The wireless communication circuit of the target monitoring device 22 may be a TDMA, CDMA, GSM or IDEN-pager device preferably having 2-way Short Messaging Service (SMS) capability or other data transmission capability. Similarly, as shown in Fig. 7, the target device 24 includes a wireless communication circuit, preferably also comprising a DSP transmitter 76 and a DSP antenna 78 coupled to CPU 80 of processor chip 82, that is operable to transmit the derived geographic coordinates of the target device 24 in an encrypted format, represented by position data 84 in Fig. 1C, to the data processing system 28 through cell towers 74 of the wireless communication network 26. The DSP transmitter 76 may also be a TDMA, CDMA, GSM or IDEN-pager device preferably having 2-way Short Messaging Service (SMS) capability or other data transmission capability. As shown in Fig. 1A, the data processing system 28 is operatively coupled to the wireless communication network 26 and includes memory or other storage media for storing the geographic coordinates transmitted from the target monitoring device 22 and the target device 24 and the time and date those coordinates are received.

At the data processing system 28, geographic coordinate information transmitted by each of the target monitoring devices 22 and the target devices 24 is preferably stored as last known locations, in latitude and longitude coordinates 86, of the devices 22, 24 (Fig. 2). A date and time stamp 88 (Fig. 2) identifying the date and time at which the geographic position information was either transmitted by the target monitoring device 22 and target device 24, or received at the data processing system 28, is preferably stored with each last known location of the target monitoring devices 22 and the target devices 24 to be stored. Preferably, each target monitoring device 22 and target device 24 has a unique device identifier 90 (Fig. 2), such as the ESN number or telephone number of the devices 22, 24, or other unique device identifier, as represented by ID data 92 in Fig. 1C, that is transmitted to the data processing system 28 with the geographic coordinate information transmitted by the devices 22 and 24. The unique device identifier is stored in memory 94 (Fig. 6) of the target monitoring device 22 and in memory 96 (Fig. 7) of the target device 24. The data processing system 28 is preferably operable to store



the geographic coordinates 86 and the date and time stamp information 88 as a record associated with the unique device identifier 90 for each target monitoring device 22 and target device 24, as shown in Fig. 2. The data processing system 28 may store multiple records for each target monitoring device 22 and target device 24 so that the last several known locations of each device 22 and 24 are stored. Alternatively, the data processing system 28 may store only the last known location of each target monitoring device 22 and target device 24 as transmitted by those devices 22, 24.

In one embodiment of the present invention, the target monitoring devices 22 and target devices 24 are configured to transmit their geographic positions to the data processing system 28 on a predetermined interval. The transmission intervals are preferably user selectable, and may vary from between a transmission every one minute to a transmission every five days, for example. Of course, other transmission intervals are possible as well. As shown in Figs. 6 and 7, the target monitoring device 22 and target device 24 each include memory, such as the memory 94, 96, respectively, which may be used to store the derived geographic positions of the devices 22, 24 between transmission cycles. According to this aspect of the present invention, the stored geographic position data of each device 22, 24 may be transmitted as a block of several geographic positions, rather than as a single geographic position, either on a periodic basis or, alternatively, only upon receipt of a polling signal 102 (Fig. 1C) transmitted by the data processing system 28 as will be described in greater detail below.

Preferably, the position data records maintained at the data processing system 28 are assigned to "accounts" established at the data processing system 28. Each "account" comprises one or more target monitoring devices 22 and one or more target devices 24. For example, an "account" may comprise a family wherein the parents each have a target monitoring device 22 assigned a unique device identifier associated with his or her name, and their children each have a target device 24 assigned a unique device identifier associated with his or her name. In this way, an easily recognizable name or other user-friendly nomenclature can be used to represent an ESN number, telephone number or other unique device identifier for each assigned target monitoring device 22 and target device 24.

Each parent's target monitoring device 22 is programmed with a displayable menu (not shown) that identifies the name or other unique device identifier of his or her spouse and the name or other unique device identifier of each child that is established in the "account". For example, an established "account" is shown by way of example in Fig. 2 including members "Mom", "Dad", "John", "Mary" and "Kelly", wherein each name is associated with a unique device identifier of either a target monitoring device 22 or a target device 24. Preferably, the ESN number, telephone number or other unique device identifier associated with each name listed in the menu of the "account" is stored in memory 94 in each target monitoring device 22. As will be described in greater detail below, the user of the target monitoring device 22 is able to select the name or other unique device identifier of each person assigned to the "account" from the displayed menu, to request position information relating to that selected person, as represented

by the target device data 104 in Fig. 1C, and to receive position information relating to that selected person from the data processing system 28. The requested position data for the selected person is received from the data processing system 28 over the wireless communication network 26 and displayed on the display 30 of the target monitoring device 22. The display 30 is  
5 preferably a high quality liquid crystal display (LCD) or thin film transistor (TFT) display coupled to the CPU 66 through a display interface 106 (Fig. 6).

For security reasons, a user of a target monitoring device 22 preferably cannot obtain position data relating to any person that is not assigned to the "account" of that user. However, it is contemplated that safety personnel, such as members of the fire and police  
10 departments, may have access to the position data of an "account" when permitted by members of the "account" or as arranged with a local public service access point. In this way, safety personnel carrying a target monitoring device 22 are able to request and obtain position data of any member assigned to a particular "account" so that individual members of that "account" can be located in the case of an emergency. In accordance with this aspect of the present invention,  
15 the unique device identifier for each member of the "account" is transmitted or otherwise made available to safety personnel or the local public service access point so that position data relating to any person in the "account" can be requested by the safety personnel and made available by the data processing system 28.

Further, as shown in Figs. 16A and 16B, position data of persons outside of a  
20 defined "account" may be accessed by a user of a target monitoring device 22 when permission to that data is granted by those persons outside of the "account". For example, a user of a target monitoring device 22 may create a menu of friends, indicated by numeral 108 in Fig. 16A, so that the user of the target monitoring device 22 is automatically alerted when any one of those friends is within a predetermined distance, such as 500 feet for example. The data processing  
25 system 28 is configured to monitor the last known location of the user of the target monitoring device 22, as well as the last known locations of the friends identified in the menu 108, and to provide an alert to the user of the target monitoring device 22 when any one of the friends is within the predetermined area, as illustrated by the display 30 of Fig. 16B.

Referring now to Fig. 6, each target monitoring device 22 includes one or more  
30 rechargeable or replaceable batteries 110 that energize the processor chip 64 and other components of the target monitoring device 22. A power management circuit 112 is preferably coupled to the battery 110 to conserve battery power when the target monitoring device 22 is not in use. For example, the power management circuit 112 may comprise a motion sensor or other type of sensor, such as an accelerometer, that is operable to determine that the target  
35 monitoring device 22 is idle and therefore not in use. In the event the target monitoring device 22 is determined to be idle, the power management circuit 112 is operable to disconnect the battery 110 from the processor chip 64 and other components of the target monitoring device 22. Of course, other power management schemes well known to those of ordinary skill in the art are possible as well without departing from the spirit and scope of the present invention.

A power monitor circuit 114 is preferably coupled to the battery 110 to provide a visible indication 116 (Fig. 3) or other indication of the battery charge status. Additionally, the power monitor circuit 114 may be configured to apply a "low battery power" signal to the CPU 66 when the voltage of the battery 110 has dropped below a predetermined voltage level. The CPU 66, in turn, may be configured to transmit a "low battery power" signal to the data processing system 28 upon receipt of the "low battery power" signal from the power monitor circuit 114. The data processing system 28 is preferably configured to transmit a "low battery power" signal to other target monitoring devices 22 assigned to the "account" so that a warning of the low battery level in any target monitoring device 22 is provided to other target monitoring devices 22 in the "account".

The target monitoring device 22 further includes a tactile interface 118 that is coupled between buttons 120a-120d and the CPU 66. Button 120a comprises a "LOCATE" button that may be used to select a particular member of an "account" from a menu (not shown) displayed on the display 30, and to request position information relating to that selected member from the data processing system 28. A single, and preferably a pair of "PANIC" buttons 120b, 120c are provided so that a user of the target monitoring device 22 can transmit an "alarm/panic" signal 122 (Fig. 1C) to the data processing system 28 when one, or preferably both "PANIC" buttons 120b, 120c are activated simultaneously for a predetermined period of time. Upon receipt of the "alarm/panic" signal 122, the data processing system 28 is preferably configured to transmit an "alarm/panic" signal to other target monitoring devices 22 assigned to the "account", and possibly to security personnel as well, so that selected individuals are immediately notified of the "alarm/panic" situation. The "MODE SELECT" button 120d is provided so that the user can configure the target monitoring device 22 to operate in a selected mode, such as to operate in the mode of a standard wireless telephone. Alternatively, it is contemplated that specific functions of the target monitoring device 22 can be performed from a programmed "function" menu (not shown) having listed functions that can be selected with standard keys on the target monitoring device 22.

The target monitoring device 22 preferably further includes a compass circuit 124 that is operable to derive the present compass heading of the target monitoring device 22 in degrees from magnetic North. The compass circuit 124 is coupled to the CPU 66 which receives the compass heading data of the target monitoring device 22 derived from the compass circuit 124. Preferably, the target monitoring device 22 is further operable to transmit the compass heading of the device 22, as represented by compass heading data 126 in Fig. 1C, to the data processing system 28 with the geographic position data and the unique device identifier of the target monitoring device 22 as described in detail below.

The wireless communication circuit of the target monitoring device 22 further includes a DSP receiver 128 coupled to the DSP antenna 70 and the CPU 66 that communicates over the wireless communication network 26 with the data processing system 28. The DSP receiver 128 is operable to receive requested position data of selected target devices 24, and

other data, from the data processing system 28 and to display the position data and other data on the display 30 of the target monitoring device 22 as described in detail below.

As shown in Fig. 7, each target device 24 includes one or more rechargeable batteries 130 that energize the processor chip 82 and other components of target device 24. A power management circuit 132, similar in function to the power management circuit 112 of the target monitoring device 22, is provided to conserve battery power in the target device 24. A power monitor circuit 134, similar in function to the power monitor circuit 114 of the target monitoring device 22, is provided so that a low battery level condition in a target device 24 is alerted to target monitoring devices 22 assigned to the "account".

A pair of "PANIC" buttons 136a, 136b are provided opposite each other on a circumference 138 (Figs. 4 and 5) of the target device 24 so that a user of the target device 24 can transmit an "alarm/panic" signal 140 (Fig. 1C) to the data processing system 28 when both "PANIC" buttons 136a, 136b are activated simultaneously for a predetermined period of time. Upon receipt of the "alarm/panic" signal 140, the data processing system 28 is preferably configured to transmit an "alarm/panic" signal 141 (Fig. 1C) to target monitoring devices 22 assigned to the "account", and possibly to security personnel as well, so that selected individuals are immediately notified of the "alarm/panic" situation.

The data processing system 28 is further preferably configured to transmit an "acknowledgment" signal 142 (Fig. 1C) to the target device 24 that initiated the "alarm/panic" signal 140 upon receipt of the "alarm/panic" signal 140 at the data processing system 28. The target device 24 preferably includes a vibrator 144 (Fig. 7) that is activated to vibrate the target device 24 upon receipt of the "acknowledgment" signal 142 from the data processing system 28. In this way, the individual 34 wearing or carrying the target device 24 is provided a silent confirmation that the "alarm/panic" signal 140 has been received by the data processing system 28.

As shown in Figs. 4, 5 and 7, the target device 24 preferably includes an audible alert button 146 positioned on the rear face 40 of the target device 24. When the audible alert button 146 is activated for a predetermined period of time, a speaker 148 within the target device 24 emits a loud audible alert, and the "alarm/panic" signal 140 described above is transmitted to the data processing system 28 for transmission to the target monitoring devices 22 assigned to the "account", and possibly to security personnel and local public service access point as well.

The rear face 40 of the target device 24 further preferably includes an antenna port 150 for connecting the target device 24 to an external antenna (not shown). A charging/power port 152 is provided so that the battery 130 within the device 24 can be recharged through a conventional battery charger (not shown). In accordance with a further aspect of the present invention, the target device 24 includes a serial port 154 that is operable to be connected to a sensor (not shown). The sensor (not shown) is configured to sense a predetermined condition and to apply data representative of the sensed condition to the target

device 24 through the serial data port 154. For example, the sensor (not shown) may be a liquid sensor that is operable to detect contact of the target device 24 with water, such as when a child carrying or wearing the target device 24 falls into a pool. The target device 24 may be configured to transmit an "alarm/panic" signal 140 as described above to the data processing system 28 when the sensor detects contact of the target device 24 with water. In this way, target monitoring devices 22 assigned to the same "account", and possibly safety personnel as well, are alerted promptly of the dangerous event upon receipt of the "alarm/panic" signal transmitted by the data processing system 28.

In accordance with another aspect of the present invention, the sensor (not shown) connected to the serial port 154 may comprise a heat sensor operable to detect heat in the vicinity of the target device 24. For example, data from the heat sensor (not shown) may be used to detect if the target device 24 has been removed from a child. In the event the heat sensor (not shown) indicates a drop in temperature below a predetermined temperature value, the target device 24 may be configured to transmit an "alarm/panic" signal 140 to the data processing system 28. In this way, target monitoring devices 22 assigned to the "account", and possibly safety personnel as well, are alerted promptly of the dangerous event that the child's target device 24 has been removed from the child's person upon receipt of the "alarm/panic" signal transmitted by the data processing system 28. Of course, it will be appreciated that other contact and non-contact proximity devices are possible as well for detecting removal of the target device 24 from a wearer's person.

In business tracking applications, the sensor (not shown) connected to the target device 24 through the serial port 154 may provide signals representative of a predetermined environmental condition, such as detection or levels of humidity, volatile organic compounds, smoke, oxygen, carbon monoxide, carbon dioxide or other environmental conditions. The sensor data, represented by the "other" data signal 156 in Fig. 1C, is transmitted by the target device 24 with the position data 84 (Fig. 1C) and ID data 92 (Fig. 1C) to the data processing system 28. In this way, the environmental condition in the vicinity of the target device 24, as well as the position of the target device 24, can be monitored and displayed at one or more target monitoring devices 22 assigned to the "account" and at one or more computer systems 158 (one shown in Fig. 1A) coupled to the data processing system 28 through a global information network 160 (Fig. 1A).

In an alternative position locating system 300 as shown in Fig. 13, where like numerals represent like parts to the position locating system 20 of Fig. 1A, the serial communication between a sensor (not shown) and the target device 24 is substituted with a short range transmitter 302 operatively coupled to a source of data 304, such as a sensor, and a short range receiver 306 operatively coupled to the target device 24. In this alternative embodiment, the short range transmitter 302 may have a relatively low power rating, i.e., two (2) Watts, and a relatively low transmitting range of less than fifty (50) feet. Data from the data source 304 is transmitted in a wireless medium to the target device 24, and the target device 24

is configured to transmit that data, as well as position data of the target device 24, to the data processing system 28 as described in detail above.

In operation of the position locating system 20 of Fig. 1A, the user of the target monitoring device 22 uses the "LOCATE" button 120a (Figs. 3 and 6) to select one of the target devices 24 that is listed on the pre-programmed menu (not shown) displayed on the target monitoring device 22. For example, as shown in Fig. 2, "Mom" has requested the location of "Mary". In accordance with one embodiment of the present invention, upon activating the "LOCATE" button 120a, the position data 72 (Fig. 1C) representative of the geographic position of "Mom's" target monitoring device 22, the compass heading data 126 (Fig. 1C) representative of the compass heading of "Mom's" target monitoring device 22 in degrees from magnetic North, the ID data 92 (Fig. 1C) representative of the unique device identifier of "Mom's" target monitoring device 22, and the target device ID data 104 (Fig. 1C) representative of the unique device identifier of "Mary's" target monitoring device 22 are transmitted to the data processing system 28 through the wireless communication network 26.

Block 162 in Fig. 2 represents the stored last known locations at the data processing system 28 of members of the "account" at the time of "Mom's" request for the location of "Mary's" target device 24 is processed. At block 164 in Fig. 2, the data processing system 28 evaluates the last known locations of "Mom" and "Mary" to establish data 166 that represents the distance between "Mom" and "Mary", i.e., 1.54 miles, and data 168 that represents the compass direction from "Mom's" target monitoring device 24 to "Mary's" target device 24, i.e., 36° NNE. At block 170, the data processing system 28 also preferably includes a GEO-Coded Address (GCA) database that establishes data 172 representing the nearest geographic address of each member in the "account", i.e., 1241 Central St, Cincinnati, OH 45248 for "Mary's" target device 24.

In block 174 of Fig. 2, the data processing system 28 is operable to transmit at least one, and preferably all of the distance, compass direction, and nearest geographic address data 166, 168 and 172 (Fig. 1C), respectively, to "Mom's" target monitoring device 22 through the wireless communication network 26. The distance data 166, the compass direction data 168, and time and date stamp data 88 are preferably displayed on the display 30 of "Mom's" target monitoring device 22, as shown in the exemplary embodiment of Fig. 3. Preferably, the compass direction data 168 representing the compass direction from "Mom's" target monitoring device 22 to "Mary's" target device 24 in degrees from magnetic North is displayed graphically as a graphical vector 176 (Fig. 3) on the display 30. In this way, if "Mom's" target monitoring device 22 is aligned with magnetic North, the graphical vector 176 will point or indicate the direction to "Mary's" target device 24. Of course, those of ordinary skill in the art will appreciate the many graphical representations of the compass direction data 168 that are possible without departing from the spirit and scope of the present invention. For example, the compass direction data 168 may be graphically represented by a hand (not shown) having a finger pointing to the

proper compass direction, a dot (not shown) positioned at the proper compass direction or any other graphical representation that displays the proper compass direction.

In the event "Mom's" target monitoring device 22 includes a compass circuit 124 for transmitting compass heading data 126 (Fig. 1C) of "Mom's" target monitoring device 22 in  
 5 degrees from magnetic North, the data processing system 28 uses the compass heading data 126 and the derived compass direction data 168 to establish data 178 (Fig. 1C) representing a relative compass heading from "Mom's" target monitoring device 22 to "Mary's" target device 24. Preferably, the data processing system 28 uses the following logic for establishing the relative  
 compass heading data 178 from a target monitoring device 22 to a target device 24, where:

10 "TMD-CH" = Compass heading of the target monitoring device 22 in  
 degrees from magnetic North;  
 "TMD-CD" = Compass direction from the target monitoring device 22  
 to the target device 24 in degrees from magnetic North; and  
 "RCH" = Relative compass heading from the target monitoring  
 15 device 22 to the target device 24.

If "TMD-CH" is less than or equal to "TMD-CD", then:

"RCH" = "TMD-CD" - "TMD-CH".

If "TMD-CH" is greater than "TMD-CD", then:

"RCH" = "360° - ("TMD-CH" - "TMD-CD").

20 For example, as shown in Figs. 14A and 14B, if the compass heading data 126 of the target monitoring device 22 in degrees from magnetic North is 15°, and the derived compass direction data 168 from the target monitoring device 22 to the target device 24 in degrees from magnetic North is 60°, then the relative compass heading from the target monitoring device 22 to target device 24 is 45°, as represented by graphical vector 180 in Fig. 14B. In this way, the  
 25 graphical vector 180 will always point or indicate the direction to the target device 24, regardless of the orientation of the target monitoring device 22 relative to magnetic North. By way of further example, as shown in Figs. 15A and 15B, if the compass heading data 126 of the target monitoring device 22 in degrees from magnetic North is 315°, and the derived compass direction data 168 from the target monitoring device 22 to the target device 24 in degrees from magnetic  
 30 North is 45°, then the relative compass heading from the target monitoring device 22 to the target device 24 is 90°, as represented by the graphical vector 180 in Fig. 15B.

Alternatively, the relative compass heading of the target monitoring device 22 to the target device 24 can be determined even when the target monitoring device 22 does not include a compass circuit 124 to establish the compass heading of the target monitoring device  
 35 22 in degrees from magnetic North. In this embodiment, the data processing system 28 is operable to derive the compass heading of the target monitoring device 22 from two last known locations of the target monitoring device 22, and use that derived compass heading data, in combination with the derived compass direction data 168 from the target monitoring device 22 to

the target device 24 in degrees from magnetic North, to establish the relative compass heading data 178 of the target monitoring device 22 to the target device 24.

In accordance with another embodiment of the present invention, it is contemplated that the target monitoring device 22 may have the capability to compute the relative compass heading data 178 of the target monitoring device 22 to the target device 24 at the target monitoring device 22 itself. In this embodiment, the target monitoring device 22 uses the compass direction data 168 from the target monitoring device 22 to the target device 24 in degrees from magnetic North as transmitted by the data processing system 28, and the compass heading data 126 of the target monitoring device 22 in degrees from magnetic North as derived from the compass circuit 124, to establish the relative compass heading of the target monitoring device 22 to the target device 24.

In accordance with one aspect of the present invention, the target device 24 may not transmit geographic position data 84 to the data processing system 28 on a periodic basis. Rather, the target device 24 may transmit a single geographic position, or a block of several geographic positions stored in memory 96, only upon receipt of the polling signal 102 (Fig. 1C) transmitted by the data processing system 28. The polling signal 102 may be initiated and applied to the target device 24 upon activation of the "LOCATE" button 120a on the target monitoring device 22. Alternatively, the polling signal 102 may be initiated solely by the data processing system 28 upon a predetermined event or condition. As shown in Fig. 7, the target device 24 includes a DSP receiver 182 coupled to the CPU 80 that is operable to receive the polling signal 102 transmitted by the data processing system 28.

Various exemplary displays on the target monitoring device 22 are illustrated in Figs. 3A-3F. Fig. 3A illustrates a graphical vector 184 displayed on a target monitoring device 22 that may represent a compass direction from the target monitoring device 22 to the target device 24 in degrees from magnetic North or, alternatively, a relative compass heading from the target monitoring device 22 to the target device. The nearest known geographical address of "Mary's" target device 24 is also illustrated as text data displayed on the display 30 of the target monitoring device 22 as derived from the GEO-Coded Address (GCA) database preferably maintained at the data processing systems 28. Fig. 3B illustrates a drowning alert text message displayed on a target monitoring device 22 in response to an "alarm/panic" signal initiated by a water sensor (not shown) coupled to the serial port 154 of the target device 24 as described in detail above.

Fig. 3C illustrates a kidnaping text message displayed on a target monitoring device 22 that is initiated by the data processing system 28. In accordance with this aspect of the present invention, the parents in an "account" are able to set a speed limit for one or more of their children in the "account", for example. The data processing system 28 is able to compute the distance traveled by the child's target device 24 between two last known locations, and is also able to compute the elapsed time between the two last known locations. From this combined data, the data processing system 28 is able to compute the traveling speed of the



child's target device 24. If the computed speed of the child's target device 24 exceeds a predetermined limit, the text message illustrated in Fig. 3C can be sent to the target monitoring devices 22 of the "account" to alert the parent's that their child is in an unauthorized car.

Fig. 3D illustrates a text message displayed on a target monitoring device 24  
5 when the data processing system 28 loses communication with a target device 24. Fig. 3E illustrates a text message displayed on a target monitoring device 22 when a "low battery voltage" signal is initiated by a target device 24 as described in detail above. Lastly, Fig. 3F illustrates an "alarm/panic" text message displayed on a target monitoring device 22 as described in detail above. It will be appreciated by those skilled in the art that the content and format of  
10 the text messages illustrated in Figs. 3 and 3A-3F can be modified without departing from the spirit and scope of the present invention.

Referring now to Figs. 1A and 12, a representative display 186 of the computer system 158 coupled to the data processing system 28 through the global information network 160 is shown. The computer system 158 and display 186 may be located at sites of safety  
15 personnel, such as at police and fire stations, ambulance dispatch centers or hospitals, the home of "account" parents, a local public service access point, and/or at sites of businesses, for example. The data processing system 28 is preferably configured to permit access through the global information network 160 to stored position data of a target device 24 or target monitoring device 22 when proper access to that data has been attained. In this way, the location of a  
20 target device 24 and/or a target monitoring device 22, as indicated by numeral 188 in Fig. 12, can be displayed on a map 190 of the display 186. The displayed location 188 of the target device 24 and/or target monitoring device 22 may be displayed as a single location or as multiple locations according to the stored last known locations of the devices 22, 24.

Still referring to Figs. 1A and 12, the position locating system 20 permits a zone  
25 192 (Fig. 12) to be defined so that the data processing system 28 provides an "alarm" signal to target monitoring devices 22 of an "account", and possibly safety personnel as well, when a target device 24 of the "account" either enters the defined zone 192 for which access is not permitted, or leaves the defined zone 192 from which departure is not permitted. The defined zone 192 is created by displaying the map 190 on the display 186 and, using cursor controls,  
30 defining a series of coordinates that define the perimeter 194 of the zone 192. A zone 192 can be defined as an allowed area or as a disallowed/forbidden zone. The zone program is then downloaded through the global information network 160 to the data processing system 28 so that the location of one or more selected target devices 24 can be monitored. It will be appreciated that the zone can also be defined at the target monitoring device 22 through entry by  
35 keys of the device 22 of geographic coordinates or other zone data, and then downloaded through the global information network 160 to the data processing system 28.

As shown in Figs. 8-11, it is contemplated that the target monitoring devices 22 and the target devices 24 may be implemented in a wrist-worn watch device 38a (Fig. 8), 38b (Figs. 9 and 10), and 38c (Fig. 11), where like numerals represent like parts. For example, the

watch devices 38a-38c include an internal battery 196, display 30 and buttons 200. In the watch device 38b of Figs. 9 and 10, the electronic components of the target monitoring device 22 or target device 24 have been implemented on a flex circuit tape 202 that is embedded within the wrist band 204 of the watch device 38b. The flex tape circuit 202 includes a wrist strap alarm wire 206, DSP transmitter/receiver circuit 208, CPU and associated RAM/ROM 210, GPS antenna 212, electronic compass 214, DSP antenna 216 and GPS receiver/processor 218. The wrist strap alarm wire 206 cooperates with the watch clasp 218 to provide a circuit that is operable to detect when the watch device 38b has been removed from the wearer's wrist. Alternatively, in the watch device 38c of Fig. 11, the electronic components of the target monitoring device 22 or target device 24 have been implemented as a series of circuit boards 220 that are coupled to the display 30 and battery 196 through a ribbon cable 222. The ribbon cable 222 may include an alarm circuit (not shown) that cooperates with the watch strap lock 224 and is operable to detect when the watch device 38c has been removed from the wearer's wrist.

A position locating system 400 in accordance with an alternative embodiment of the present invention is shown in Figs. 1B and 2, where like numerals represent like parts to the position locating system 20 of Fig. 1A. In this embodiment, the wireless communication network 26 includes position location circuits 402 that are operable to determine the locations of the target monitoring devices 22 and the target devices 24 from wireless signals 404 transmitted by the devices 22, 24. The position location circuits 402 may use various algorithms known to those of ordinary skill in the art, such as time difference or arrival, angle of arrival, enhanced observed time difference or multi-path finger printing, to derive the geographic locations, such as latitude and longitude, of the target monitoring devices 22 and the target devices 24 from the wireless signals 404 transmitted by the devices 22, 24. As shown in Figs. 1B and 2, the position location circuits 404 are coupled to the data processing system 28 and apply data 406 representing the derived geographic locations of the target monitoring devices 22 and the target devices 24 to the data processing system 28. The position location circuits 402 further apply data 408 representing the unique device identifier of the devices 22, 24, and preferably date and time stamp information (not shown) to the data processing system 28 so that the data processing system 28 can store the geographic coordinate data 86 and the date and time stamp information 88 as a record associated with the unique device identifier for each target monitoring device 22 and target device 24 as described in detail above.

While the present invention has been illustrated by a description of various embodiments and while these embodiments have been described in considerable detail, it is not the intention of the applicants to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus and method, and illustrative example shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of applicants' general inventive concept.

Having described the invention, what is claimed is:

1. A position locating system adapted to communicate with a wireless communication network, comprising:

a target device including:

5 a position locating circuit operable to determine a geographic position of the target device; and

a wireless communication circuit operable to transmit data representative of the determined geographic position of the target device to the wireless communication network;

10 a data processing system adapted to be operatively coupled to the wireless communication network and operable to receive the geographic position data transmitted by the target device, process the geographic position data transmitted by the target device into data representative of a position of the target device, and transmit the position data of the target

15 a target monitoring device including:

a wireless communication circuit operable to receive the position data of the target device transmitted by the data processing system; and

a display operable to display the position of the target device according to the position data of the target device transmitted by the data processing system.

20 2. The position locating system of claim 1 wherein the target monitoring device further includes:

a position locating circuit operable to determine a geographic position of the target monitoring device; and

25 a wireless communication circuit operable to transmit data representative of the determined geographic position of the target monitoring device to the wireless communication network.

3. The position locating system of claim 2 wherein the data processing system is further operable to receive the geographic position data transmitted by the target monitoring device, and process the geographic position data transmitted by the target monitoring device into data representative of a position of the target monitoring device.

4. The position locating system of claim 3 wherein the data processing system is further operable to process the geographic position data transmitted by the target device and the geographic position data transmitted by the target monitoring device into data representative of a distance between the target device and the target monitoring device and transmit the distance data as the position data of the target device to the wireless communication network.

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5. The position locating system of claim 4 wherein the target monitoring device is further operable to receive the distance data transmitted by the data processing system and display the distance data as the position of the target device on the display.

6. The position locating system of claim 3 wherein the data processing system is further operable to process the geographic position data transmitted by the target device and the geographic position data transmitted by the target monitoring device into data representative of a compass direction from the target monitoring device to the target device and transmit the compass direction data as the position data of the target device to the wireless communication network.

7. The position locating system of claim 6 wherein the target monitoring device is further operable to receive the compass direction data transmitted by the data processing system and display the compass direction data as the position of the target device on the display.

8. The position locating system of claim 7 wherein the target monitoring device is further operable to graphically display the compass direction data on the display.

9. The position locating system of claim 8 wherein the compass direction data is displayed on the display as a graphical vector.

10. The position locating system of claim 3 wherein the target monitoring device further includes a compass circuit operable to generate data representative of a compass heading of the target monitoring device and transmit the compass heading data to the wireless communication network.

11. The position locating system of claim 10 wherein the data processing system is further operable to process the geographic position data transmitted by the target device and the geographic position data and compass heading data transmitted by the target monitoring device into data representative of a relative compass heading from the target monitoring device to the target device and transmit the relative compass heading data as the position data of the target device to the wireless communication network.

12. The position locating system of claim 11 wherein the target monitoring device is further operable to receive the relative compass heading data transmitted by the data processing system and display the relative compass heading data as the position of the target device on the display.

13. The position locating system of claim 12 wherein the target monitoring device is further operable to graphically display the relative compass heading data on the display.

14. The position locating system of claim 13 wherein the relative compass heading data is displayed on the display as a graphical vector.

5 15. The position locating system of claim 1 wherein the position locating circuit of the target device comprises a GPS receiver and a GPS processor.

16. The position locating system of claim 2 wherein the position locating circuit of the target monitoring device comprises a GPS receiver and a GPS processor.

10 17. The position locating system of claim 1 wherein the wireless communication circuit of the target device comprises at least one of a transmitter circuit operable to transmit signals to the wireless communication network and a receiver circuit operable to receive signals from the wireless communication network.

15 18. The position locating system of claim 2 wherein the wireless communication circuit of the target monitoring device comprises a transmitter circuit operable to transmit signals to the wireless communication network and a receiver circuit operable to receive signals from the wireless communication network.

19. The position locating system of claim 1 wherein the position data of the target device transmitted by the data processing system comprises a nearest geographic address of the target device.

20 20. The position locating system of claim 1 wherein the data processing system includes a memory and is operable to store a plurality of the position data of the target device in the memory.

25 21. The position locating system of claim 3 wherein the data processing system includes a memory and is operable to store a plurality of the position data of the target monitoring device in the memory.

22. The position locating system of claim 1 wherein the data processing system is operatively coupled to a global information network.

23. The position locating system of claim 1 further comprising a display operatively coupled to the data processing system and operable to display the position of the target device.

24. The position locating system of claim 1 wherein the target device further includes a sensor coupled to the target device and operable to detect a predetermined condition.

25. The position locating system of claim 24 wherein the target device is further operable to transmit data representative of the predetermined condition detected by the sensor to  
5 the wireless communication network.

26. The position locating system of claim 25 wherein the sensor comprises a liquid sensor operable to detect contact of the target device with a liquid.

27. The position locating system of claim 25 wherein the sensor comprises a heat sensor operable to detect heat in the proximate area of the target device.

10 28. The position locating system of claim 1 wherein the target device comprises a wrist-worn watch device having time keeping functions.

29. The position locating system of claim 1 wherein the target monitoring device comprises a wrist-worn watch device having time keeping functions.

30. The position locating system of claim 1 wherein the data processing system  
15 includes a polling circuit operable to generate a polling signal and transmit the polling signal to the wireless communication network.

31. The position locating system of claim 30 wherein the target device is further operable to receive the polling signal transmitted by the data processing device and, in response to receipt of the polling signal, transmit data representative of the determined geographic position  
20 of the target device to the wireless communication network.

32. The position locating system of claim 1 wherein the target device is further operable to transmit, at a predetermined interval, data representative of the determined geographic position of the target device to the wireless communication network.

33. The position locating system of claim 2 wherein the target monitoring device is  
25 further operable to transmit, at a predetermined interval, data representative of the determined geographic position of the target monitoring device to the wireless communication network.

34. A position locating system adapted to communicate with a wireless communication network including a position locating circuit operatively coupled to the wireless communication network, comprising:

a target device including:

a wireless communication circuit operable to transmit signals to the wireless communication network whereby the position locating circuit is operable to determine a geographic position of the target device and generate data representative of the geographic position of the target device upon processing of the signals transmitted by the target device;

a data processing system adapted to be operatively coupled to the wireless communication network and the position locating circuit and operable to receive the geographic position data of the target device generated by the position locating circuit, process the geographic position data of the target device generated by the position locating circuit into data representative of a position of the target device, and transmit the position data of the target device to the wireless communication network; and

a target monitoring device including:

a wireless communication circuit operable to receive the position data of the target device transmitted by the data processing system; and

a display operable to display the position of the target device according to the position data of the target device transmitted by the data processing system.

35. The position locating system of claim 34 wherein the target monitoring device further includes:

a wireless communication circuit operable to transmit signals to the wireless communication network whereby the position locating circuit is operable to determine a geographic position of the target device and generate data representative of the geographic position of the target monitoring device upon processing of the signals transmitted by the target monitoring device.

36. The position locating system of claim 35 wherein the data processing system is further operable to receive the geographic position data of the target monitoring device generated by the position locating device, and process the geographic position data of the target monitoring device generated by the position locating system into data representative of a position of the target monitoring device.

37. The position locating system of claim 36 wherein the data processing system is further operable to process the geographic position data of the target device and the geographic position data of the target monitoring device into data representative of a distance between the target device and the target monitoring device and transmit the distance data as the position data of the target device to the wireless communication network.

38. The position locating system of claim 37 wherein the target monitoring device is further operable to receive the distance data transmitted by the data processing system and display the distance data as the position of the target device on the display.

5 39. The position locating system of claim 36 wherein the data processing system is further operable to process the geographic position data of the target device and the geographic position data of the target monitoring device into data representative of a compass direction from the target monitoring device to the target device and transmit the compass direction data as the position data of the target device to the wireless communication network.

10 40. The position locating system of claim 39 wherein the target monitoring device is further operable to receive the compass direction data transmitted by the data processing system and display the compass direction data as the position of the target device on the display.

41. The position locating system of claim 40 wherein the target monitoring device is further operable to graphically display the compass direction data on the display.

15 42. The position locating system of claim 41 wherein the compass direction data is displayed on the display as a graphical vector.

43. The position locating system of claim 36 wherein the target monitoring device further includes a compass circuit operable to generate data representative of a compass heading of the target monitoring device and transmit the compass heading data to the wireless communication network.

20 44. The position locating system of claim 43 wherein the data processing system is further operable to process the geographic position data of the target device and the geographic position data and compass heading data of the target monitoring device into data representative of a relative compass heading from the target monitoring device to the target device and transmit the relative compass heading data as the position data of the target device to the wireless  
25 communication network.

45. The position locating system of claim 44 wherein the target monitoring device is further operable to receive the relative compass heading data transmitted by the data processing system and display the relative compass heading data as the position of the target device on the display.

30 46. The position locating system of claim 45 wherein the target monitoring device is further operable to graphically display the relative compass heading data on the display.



47. The position locating system of claim 46 wherein the relative compass heading data is displayed on the display as a graphical vector.

48. The position locating system of claim 34 wherein the wireless communication circuit of the target device comprises at least one of a transmitter circuit operable to transmit signals to the wireless communication network and a receiver circuit operable to receive signals from the wireless communication network.

49. The position locating system of claim 35 wherein the wireless communication circuit of the target monitoring device comprises a transmitter circuit operable to transmit signals to the wireless communication network and a receiver circuit operable to receive signals from the wireless communication network.

50. The position locating system of claim 34 wherein the position data of the target device transmitted by the data processing system comprises a nearest geographic address of the target device.

51. The position locating system of claim 34 wherein the data processing system includes a memory and is operable to store a plurality of the position data of the target device in the memory.

52. The position locating system of claim 36 wherein the data processing system includes a memory and is operable to store a plurality of the position data of the target monitoring device in the memory.

53. The position locating system of claim 34 wherein the data processing system is operatively coupled to a global information network.

54. The position locating system of claim 34 further comprising a display operatively coupled to the data processing system and operable to display the position of the target device.

55. The position locating system of claim 34 wherein the target device further includes a sensor coupled to the target device and operable to detect a predetermined condition.

56. The position locating system of claim 55 wherein the target device is further operable to transmit data representative of the predetermined condition detected by the sensor to the wireless communication network.

57. The position locating system of claim 56 wherein the sensor comprises a liquid sensor operable to detect contact of the target device with a liquid.

58. The position locating system of claim 56 wherein the sensor comprises a heat sensor operable to detect heat in the proximate area of the target device.

59. The position locating system of claim 34 wherein the target device comprises a wrist-worn watch device having time keeping functions.

60. The position locating system of claim 34 wherein the target monitoring device comprises a wrist-worn watch device having time keeping functions.

61. A target monitoring device configured to monitor and display a position of a target device by communicating with a data processing system through a wireless communication network, comprising:

a wireless communication circuit operable to receive position data of the target device transmitted by the data processing system; and

a display operable to display the position of the target device according to the position data of the target device transmitted by the data processing system.

62. The target monitoring device of claim 61 wherein the position data of the target device transmitted by the data processing system comprises the nearest geographic address of the target device.

63. The target monitoring device of claim 61 wherein the position data of the target device transmitted by the data processing system comprises a distance between the target device and the target monitoring device.

64. The target monitoring device of claim 61 wherein the position data of the target device transmitted by the data processing system comprises a compass direction from the target monitoring device to the target device.

65. The target monitoring device of claim 61 wherein the position data of the target device transmitted by the data processing system comprises a relative compass heading from the target monitoring device to the target device.

66. The target monitoring device of claim 61 wherein the wireless communication circuit of the target monitoring device comprises a transmitter circuit operable to transmit signals

to the wireless communication network and a receiver circuit operable to receive signals from the wireless communication network.

67. The target monitoring device of claim 61 wherein the target monitoring device comprises a wrist-worn watch device having time keeping functions.

5 68. A method of monitoring and displaying a position of a target device at a target monitoring device by communicating with a data processing system through a wireless communication network, comprising:

communicating from the target device to the data processing system data that is representative of the geographic position of the target device;

10 receiving at the data processing system the geographic position data communicated from the target device;

processing at the data processing system the geographic position data communicated from the target device into data representative of a position of the target device;

15 communicating from the data processing system to the target monitoring device the position data of the target device; and

displaying at the target monitoring device the position of the target device according to the position data of the target device communicated from the data processing system.

69. The method of claim 68 further comprising:

20 communicating from the target monitoring device to the data processing system data that is representative of the geographic position of the target monitoring device;

receiving at the data processing system the geographic position data communicated from the target monitoring device; and

25 processing at the data processing system the geographic position data communicated from the target monitoring device into data representative of a position of the target monitoring device.

70. The method of claim 69 further comprising:

30 processing at the data processing system the geographic position data communicated from the target device and the geographic position data communicated from the target monitoring device into data representative of a distance between the target device and the target monitoring device;

communicating from the data processing system to the target monitoring device the distance data as the position data of the target device; and

35 displaying at the target monitoring device the distance data as the position of the target device.

71. The method of claim 69 further comprising:  
processing at the data processing system the geographic position data  
communicated from the target device and the geographic position data communicated from the  
target monitoring device into data representative of a compass direction from the target  
5 monitoring device to the target device;  
communicating from the data processing system to the target monitoring device  
the compass direction data as the position data of the target device; and  
displaying at the target monitoring device the compass direction data as the  
position of the target device.

10 72. The method of claim 69 further comprising:  
communicating from the target monitoring device to the data processing system  
data that is representative of the compass heading of the target monitoring device;  
receiving at the data processing system the compass heading data communicated  
from the target monitoring device;

15 processing at the data processing system the geographic position data  
communicated from the target device and the geographic position data and compass heading data  
communicated from the target monitoring device into data representative of a relative compass  
heading from the target monitoring device to the target device;  
communicating from the data processing system to the target monitoring device  
20 the relative compass heading data as the position data of the target device; and  
displaying at the target monitoring device the relative compass heading data as  
the position of the target device.

73. The method of claim 68 wherein the position data of the target device  
communicated from the data processing system comprises a nearest geographic address of the  
25 target device.

74. A method of monitoring and displaying a position of a target device at a target  
monitoring device by communicating with a data processing system through a wireless  
communication network, comprising:

30 transmitting signals from the target device to the wireless communication  
network;

processing the signals transmitted from the target device to determine a  
geographic position of the target device;

communicating to the data processing system data that is representative of the  
geographic position of the target device;

35 receiving at the data processing system the geographic position data of the target  
device;

processing at the data processing system the geographic position data of the target device into data representative of a position of the target device;

communicating from the data processing system to the target monitoring device the position data of the target device; and

5 displaying at the target monitoring device the position of the target device according to the position data of the target device communicated from the data processing system.

75. The method of claim 74 further comprising:

10 transmitting signals from the target monitoring device to the wireless communication network;

processing the signals transmitted from the target monitoring device to determine a geographic position of the target monitoring device;

communicating to the data processing system data that is representative of the geographic position of the target monitoring device;

15 receiving at the data processing system the geographic position data of the target monitoring device; and

processing at the data processing system the geographic position data of the target monitoring device into data representative of a position of the target monitoring device.

76. The method of claim 75 further comprising:

20 processing at the data processing system the geographic position data of the target device and the geographic position data of the target monitoring device into data representative of a distance between the target device and the target monitoring device;

communicating from the data processing system to the target monitoring device the distance data as the position data of the target device; and

25 displaying at the target monitoring device the distance data as the position of the target device.

77. The method of claim 75 further comprising:

30 processing at the data processing system the geographic position data of the target device and the geographic position data of the target monitoring device into data representative of a compass direction from the target monitoring device to the target device;

communicating from the data processing system to the target monitoring device the compass direction data as the position data of the target device; and

displaying at the target monitoring device the compass direction data as the position of the target device.

35 78. The method of claim 75 further comprising:

communicating from the target monitoring device to the data processing system data that is representative of the compass heading of the target monitoring device;

receiving at the data processing system the compass heading data communicated from the target monitoring device;

5 processing at the data processing system the geographic position data of the target device and the geographic position data and compass heading data of the target monitoring device into data representative of a relative compass heading from the target monitoring device to the target device;

10 communicating from the data processing system to the target monitoring device the relative compass heading data as the position data of the target device; and

displaying at the target monitoring device the relative compass heading data as the position of the target device.

79. The method of claim 74 wherein the position data of the target device communicated from the data processing system comprises a nearest geographic address of the target device.

80. A method of monitoring and displaying positions of a selected plurality of target devices at a target monitoring device by communicating with a data processing system through a wireless communication network, comprising:

20 creating an account at the data processing system comprising the selected plurality of target devices and the target monitoring device;

communicating from the selected plurality of target devices to the data processing system data that is representative of the geographic positions of the selected plurality of target devices;

25 receiving at the data processing system the geographic position data communicated from the selected plurality of target devices;

processing at the data processing system the geographic position data communicated from the selected plurality target devices into data representative of positions of the selected plurality of target devices;

30 communicating from the data processing system to the target monitoring device the position data of the selected plurality of target devices; and

displaying at the target monitoring device the positions of the selected plurality of target devices according to the position data of the selected plurality of target devices communicated from the data processing system.

81. A method of monitoring and displaying an alarm condition of a target device at a target monitoring device by communicating with a data processing system through a wireless communication network, comprising:

communicating from the target device to the data processing system data that is representative of an alarm condition of the target device;

receiving at the data processing system the alarm condition data communicated from the target device;

5 processing at the data processing system the alarm condition data communicated from the target device into data representative of an alarm condition of the target device;

communicating from the data processing system to the target monitoring device the alarm condition data of the target device; and

10 displaying at the target monitoring device the alarm condition of the target device according to the alarm condition data communicated from the data processing system.

82. The method of claim 81 further comprising:

communicating from the data processing system to the target device an acknowledgment signal upon receipt of the alarm condition data communicated from the target device.

15 83. A position locating system adapted to communicate with a wireless communication network, comprising:

a source of data;

a wireless transmitter operatively coupled to the source of data and operable to transmit data from the source of data in a wireless medium;

20 a target device including:

a wireless receiver operable to receive the data transmitted by the wireless transmitter;

a position locating circuit operable to determine a geographic position of the target device; and

25 a wireless communication circuit operable to transmit the data received from the wireless transmitter and data representative of the determined geographic position of the target device to the wireless communication network;

a data processing system adapted to be operatively coupled to the wireless communication network and operable to receive the data and geographic position data transmitted by the target device, process the geographic position data transmitted by the target device into data representative of a position of the target device, and transmit the data and position data of the target device to the wireless communication network; and

a target monitoring device including:

35 a wireless communication circuit operable to receive the data and position data of the target device transmitted by the data processing system; and

a display operable to display the data and the position of the target device according to the data and the position data of the target device transmitted by the data processing system.



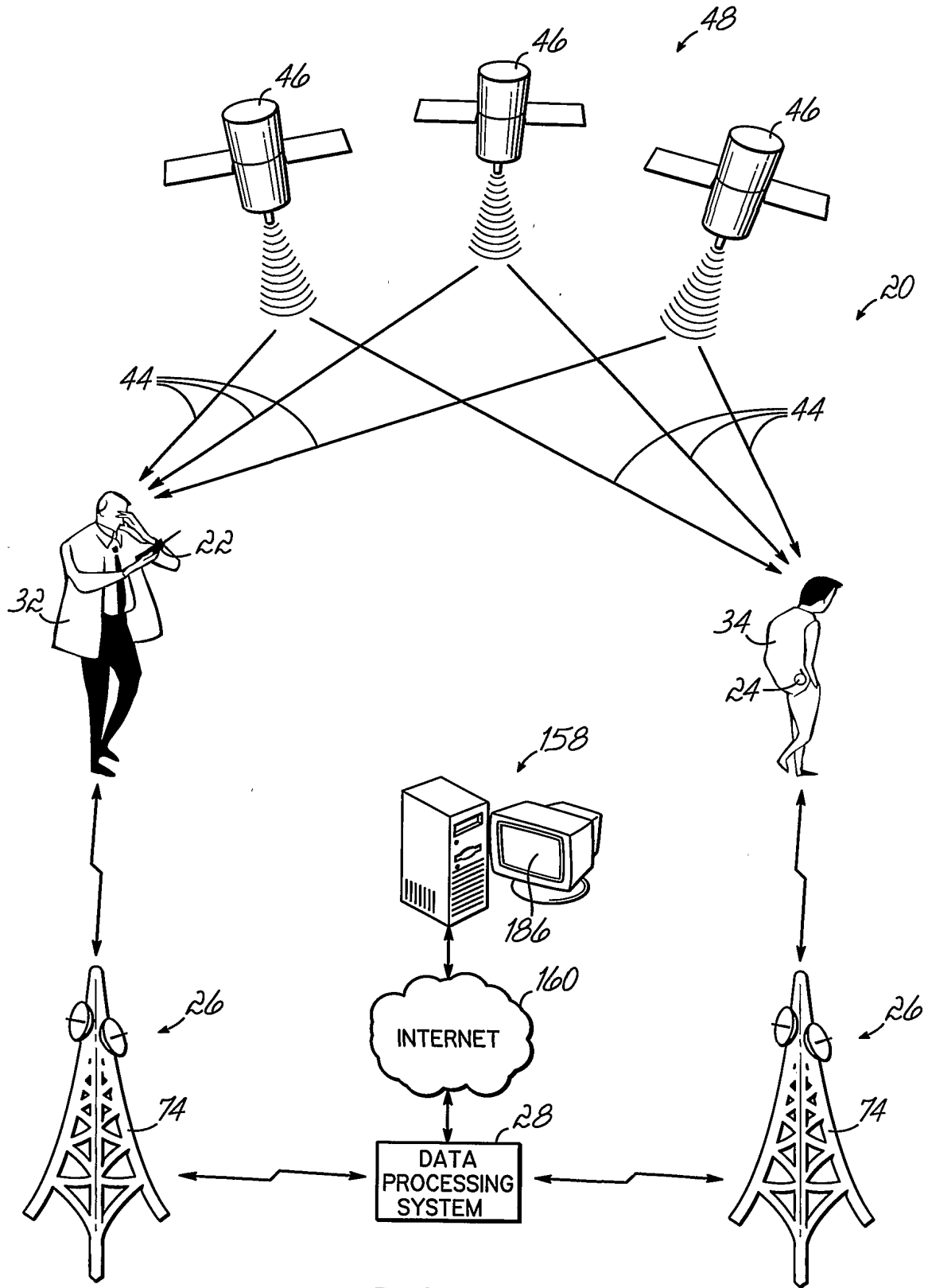


FIG. 1A

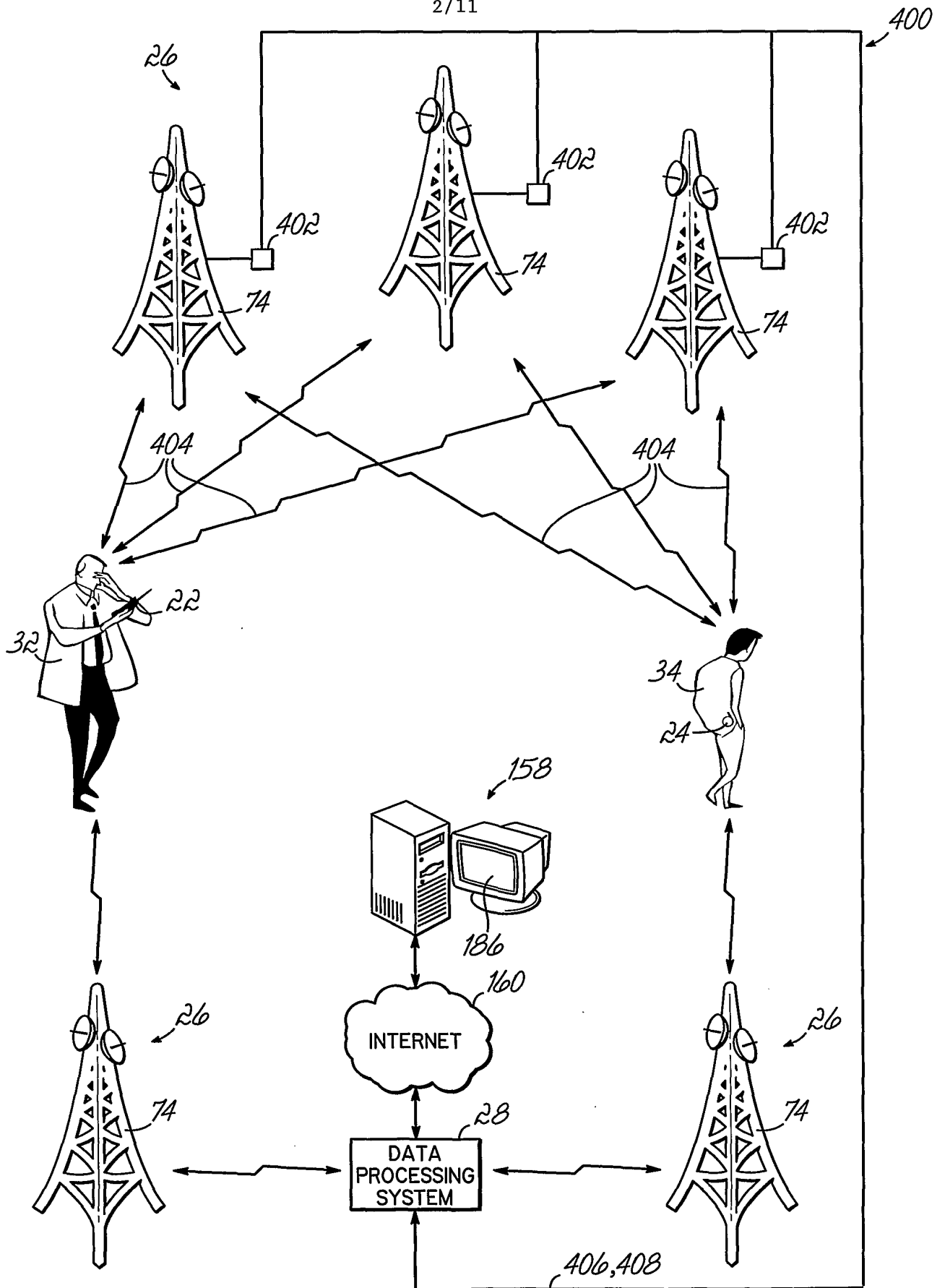


FIG. 1B

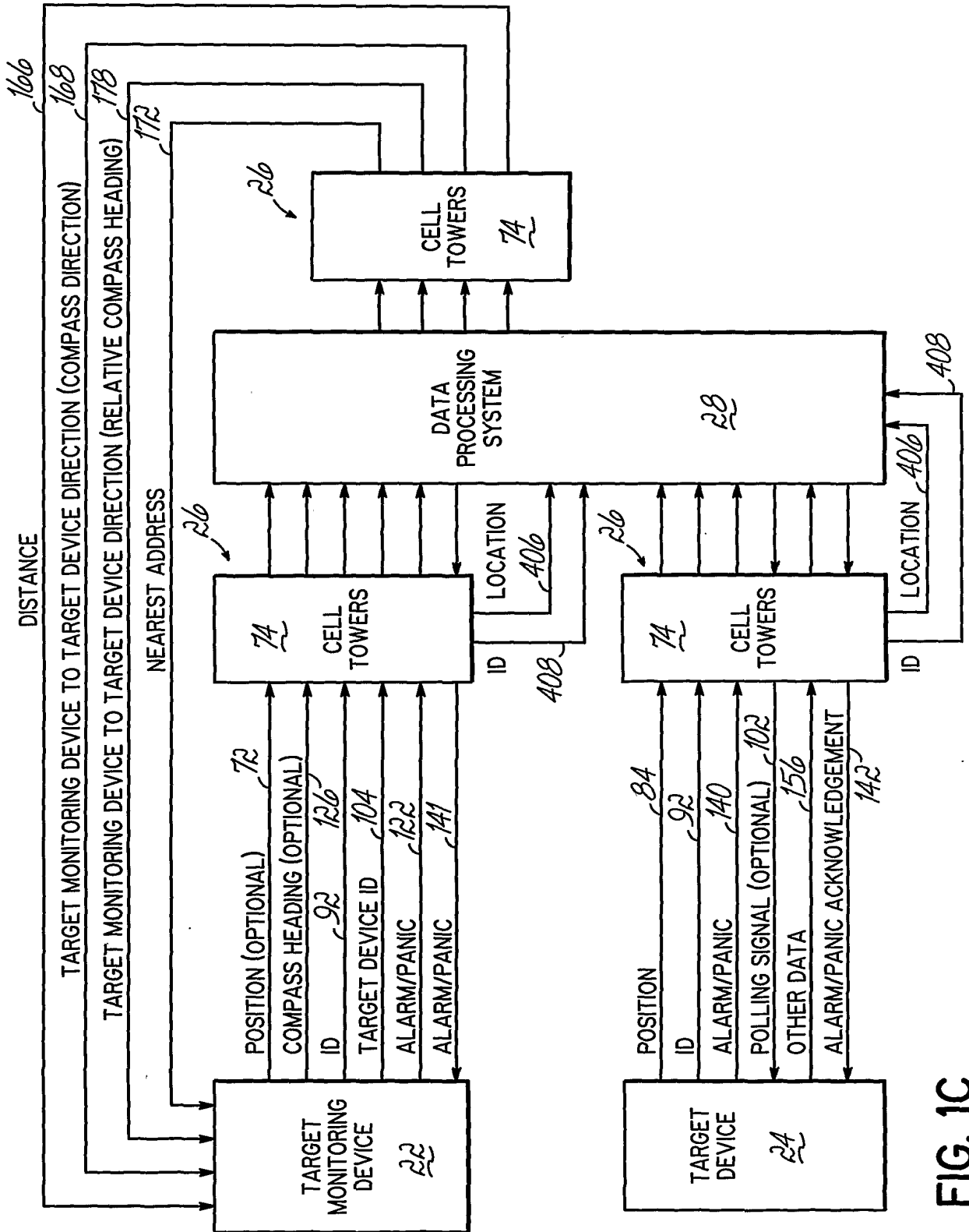


FIG. 1C

4/11

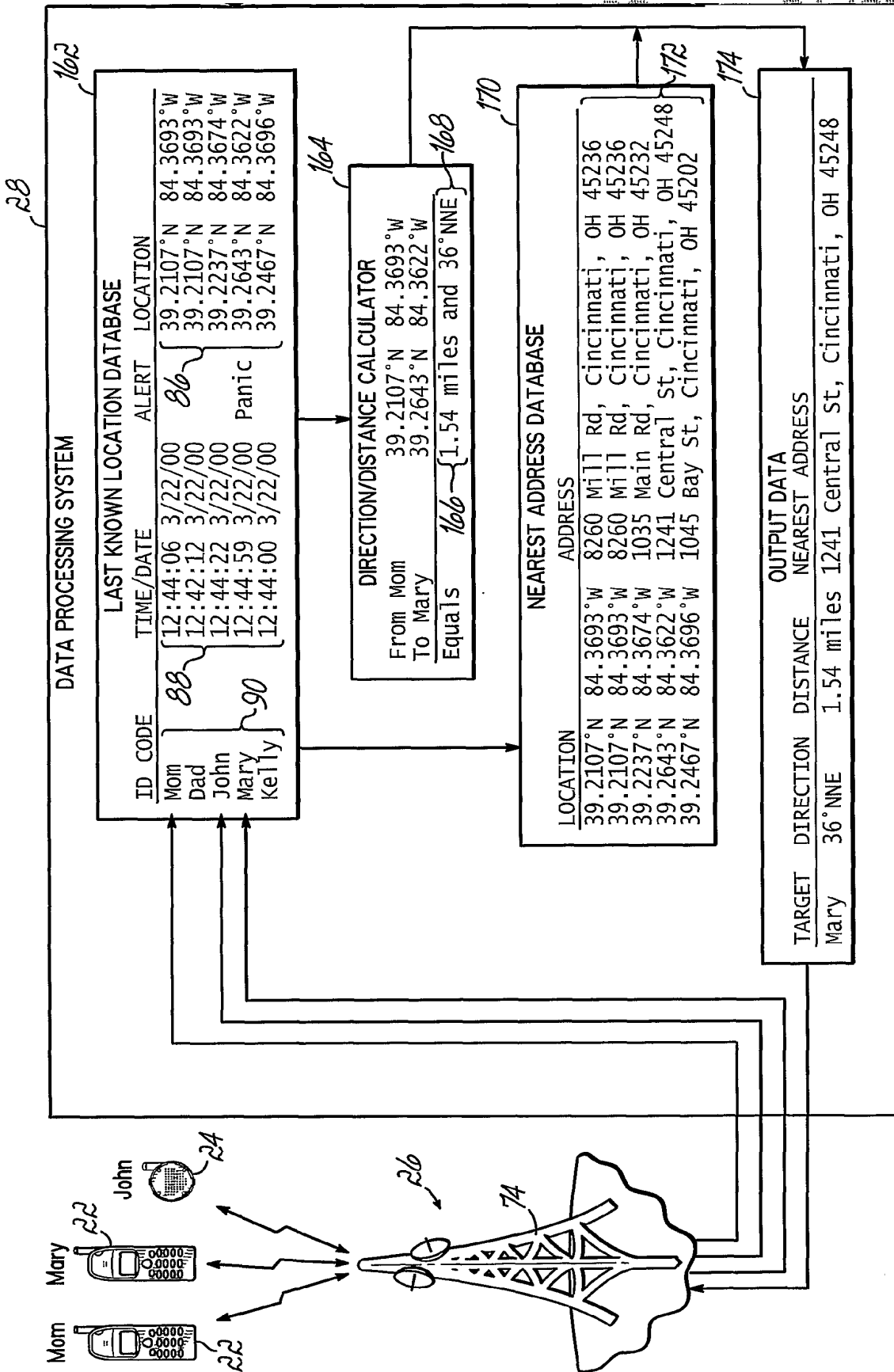


FIG. 2

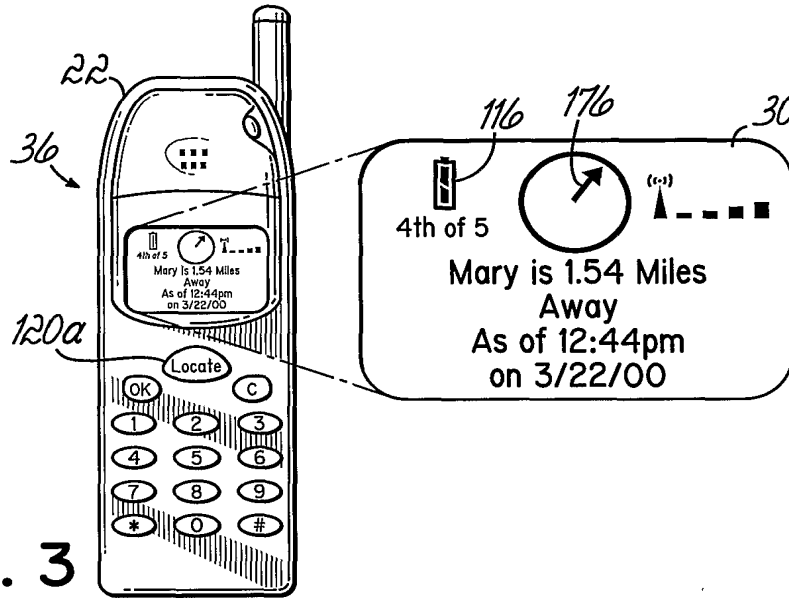


FIG. 3

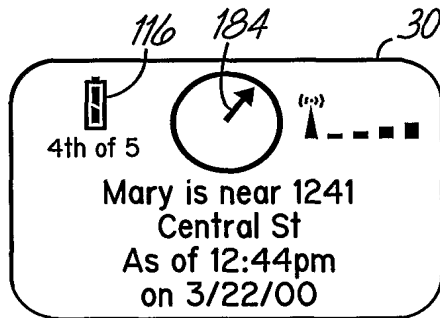


FIG. 3A

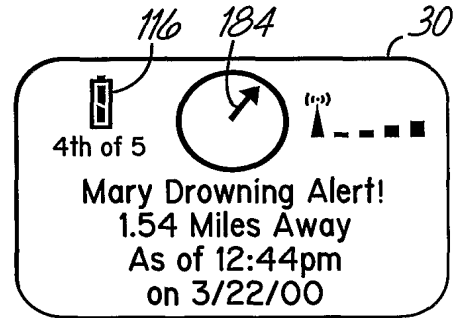


FIG. 3B

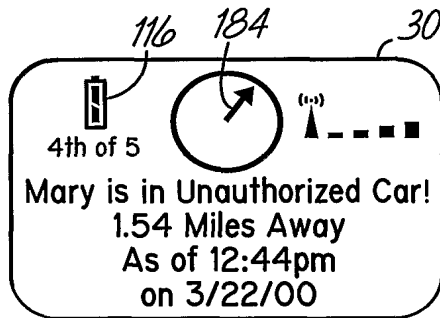


FIG. 3C

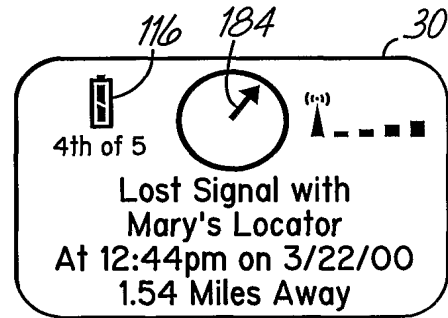


FIG. 3D

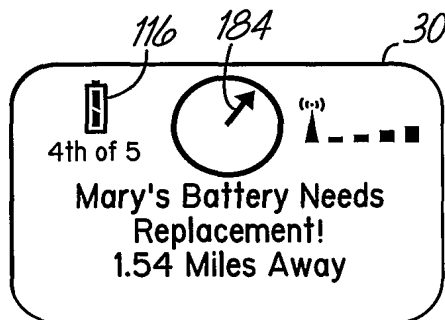


FIG. 3E

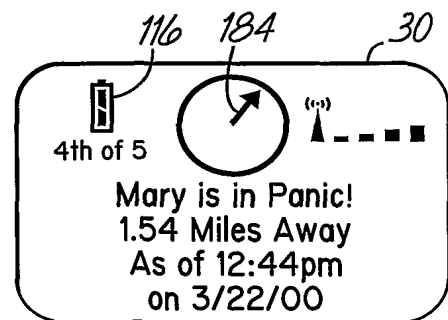


FIG. 3F

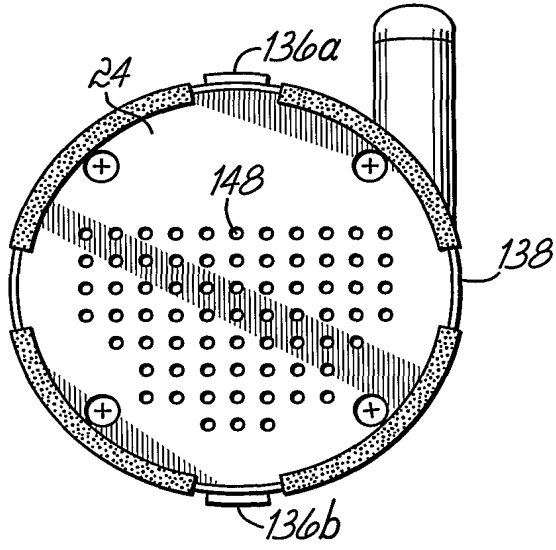


FIG. 4

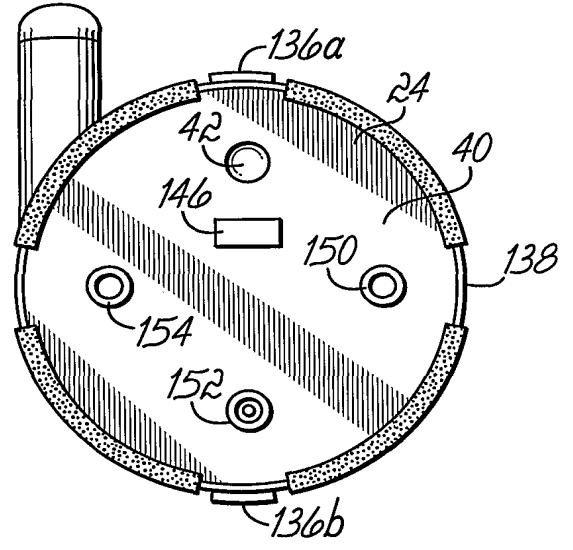


FIG. 5

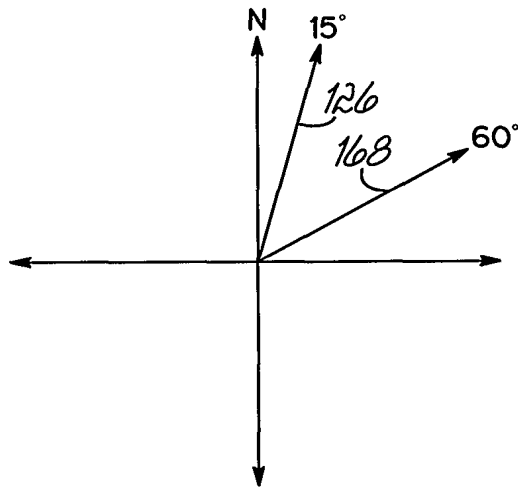


FIG. 14A

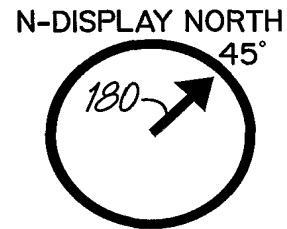


FIG. 14B

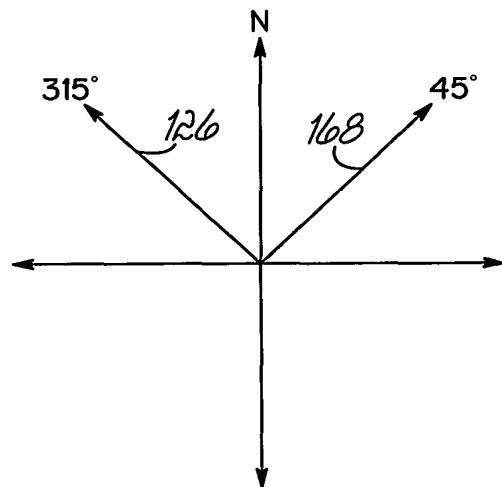


FIG. 15A

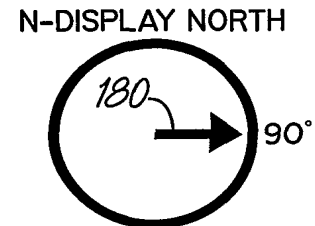


FIG. 15B

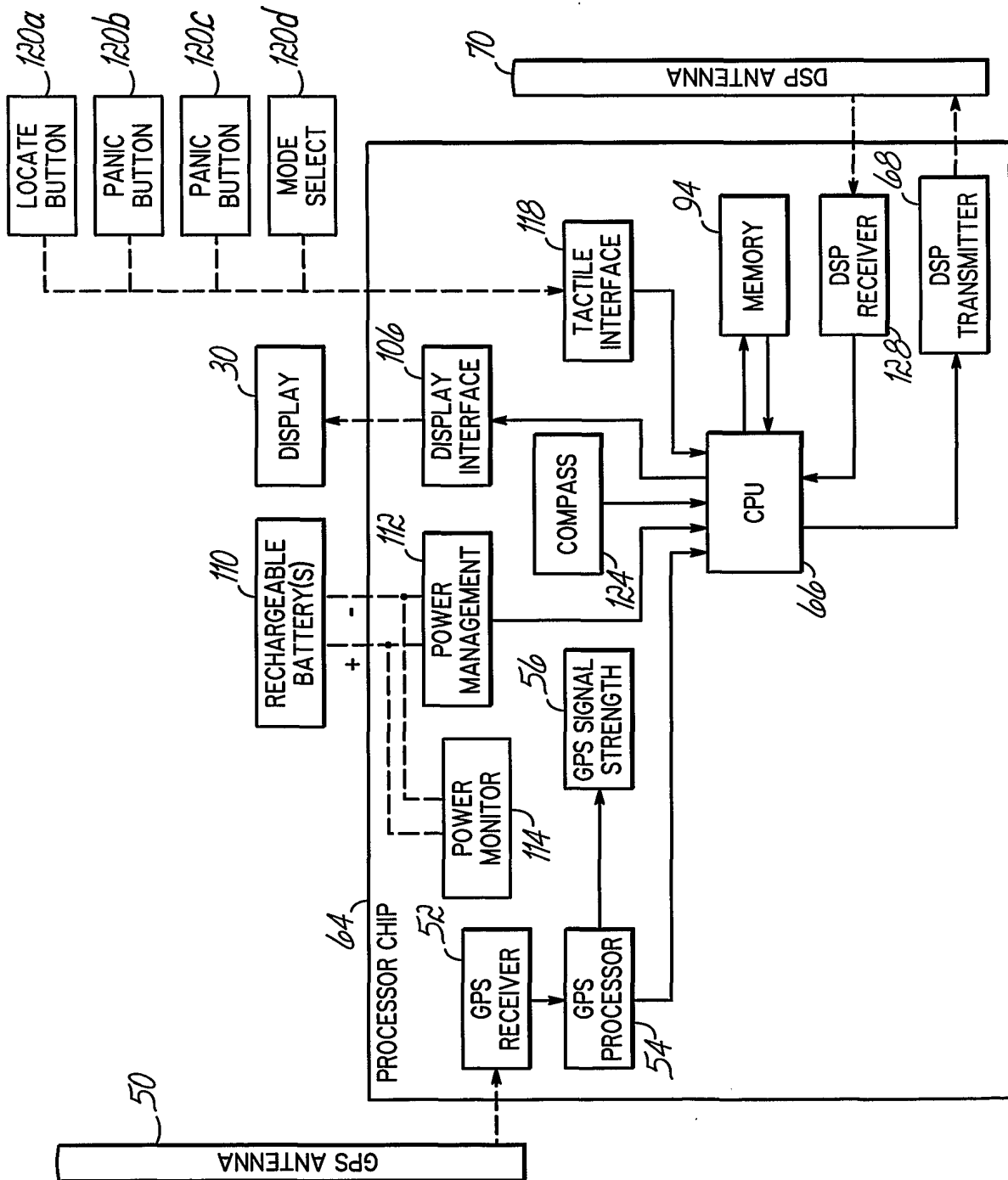


FIG. 6

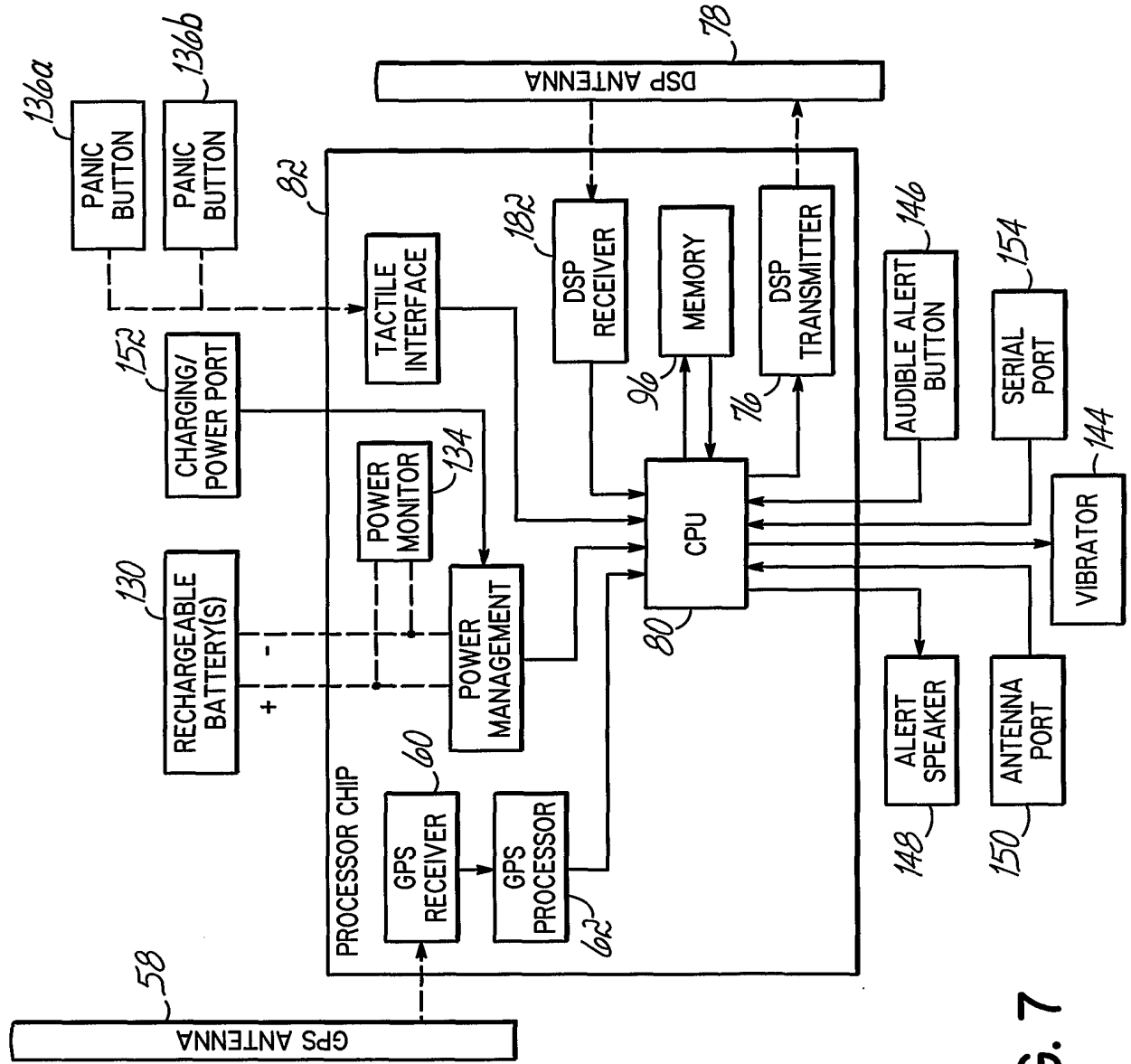


FIG. 7



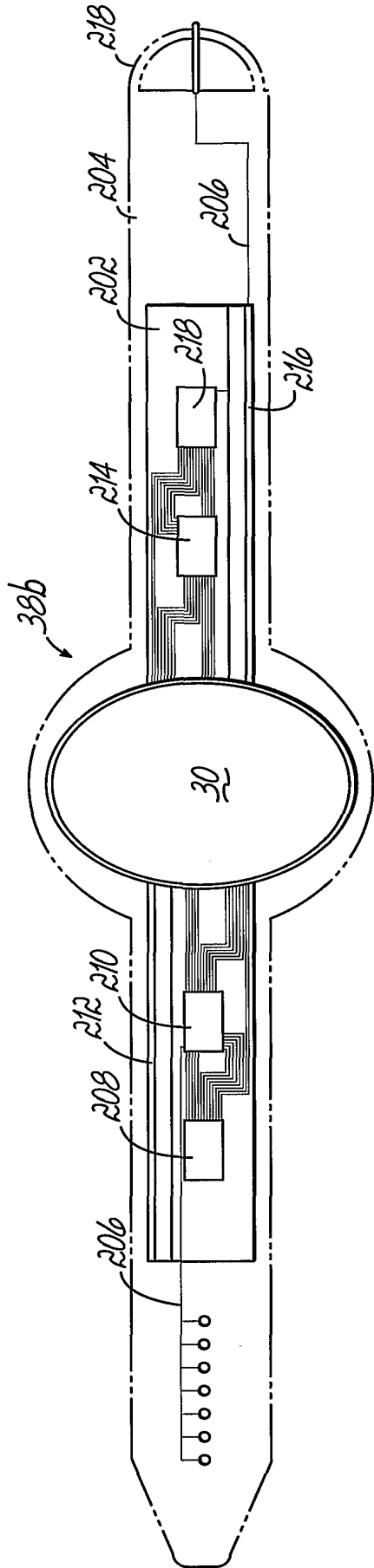


FIG. 9



FIG. 10

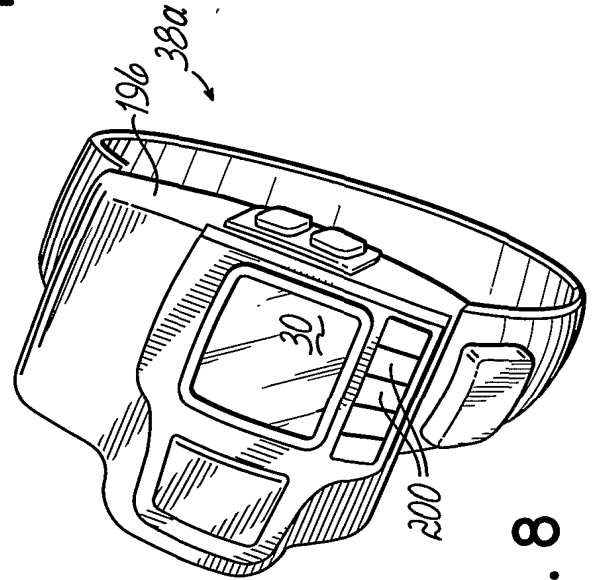


FIG. 8

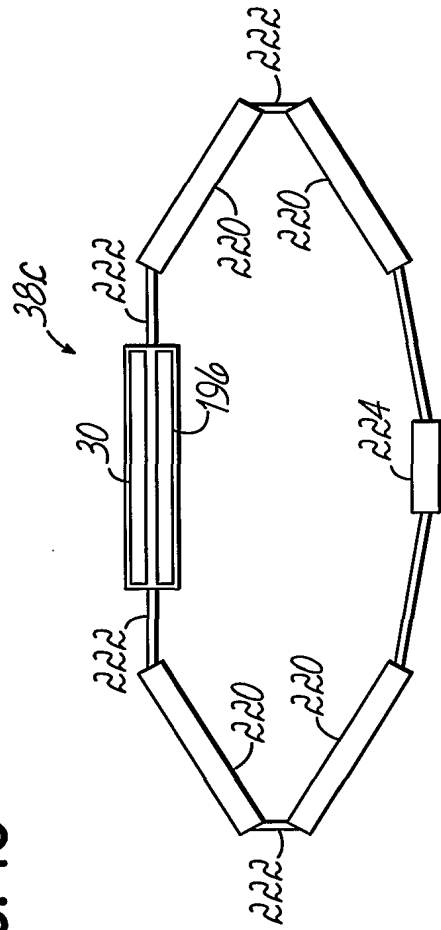


FIG. 11

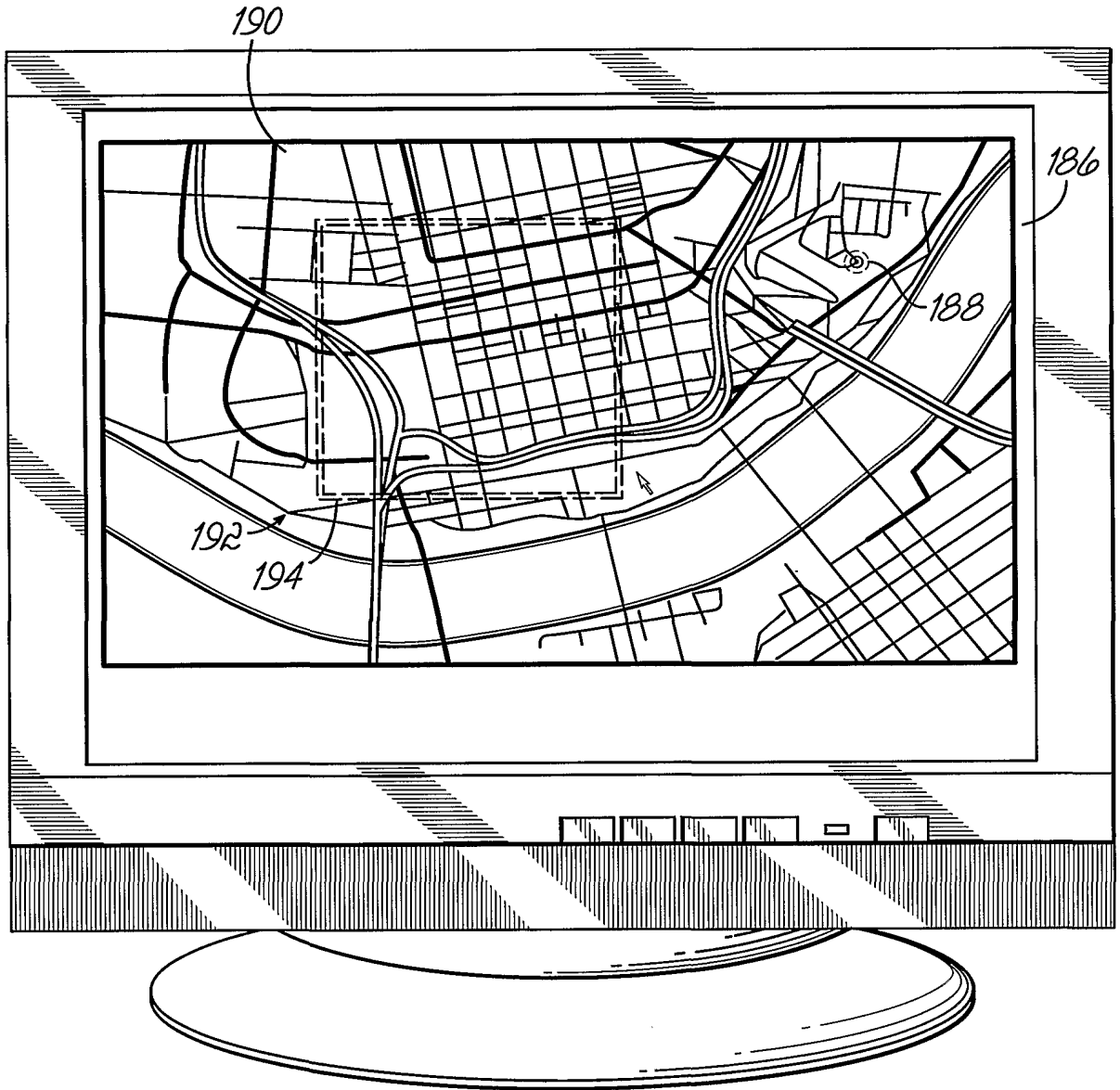


FIG. 12

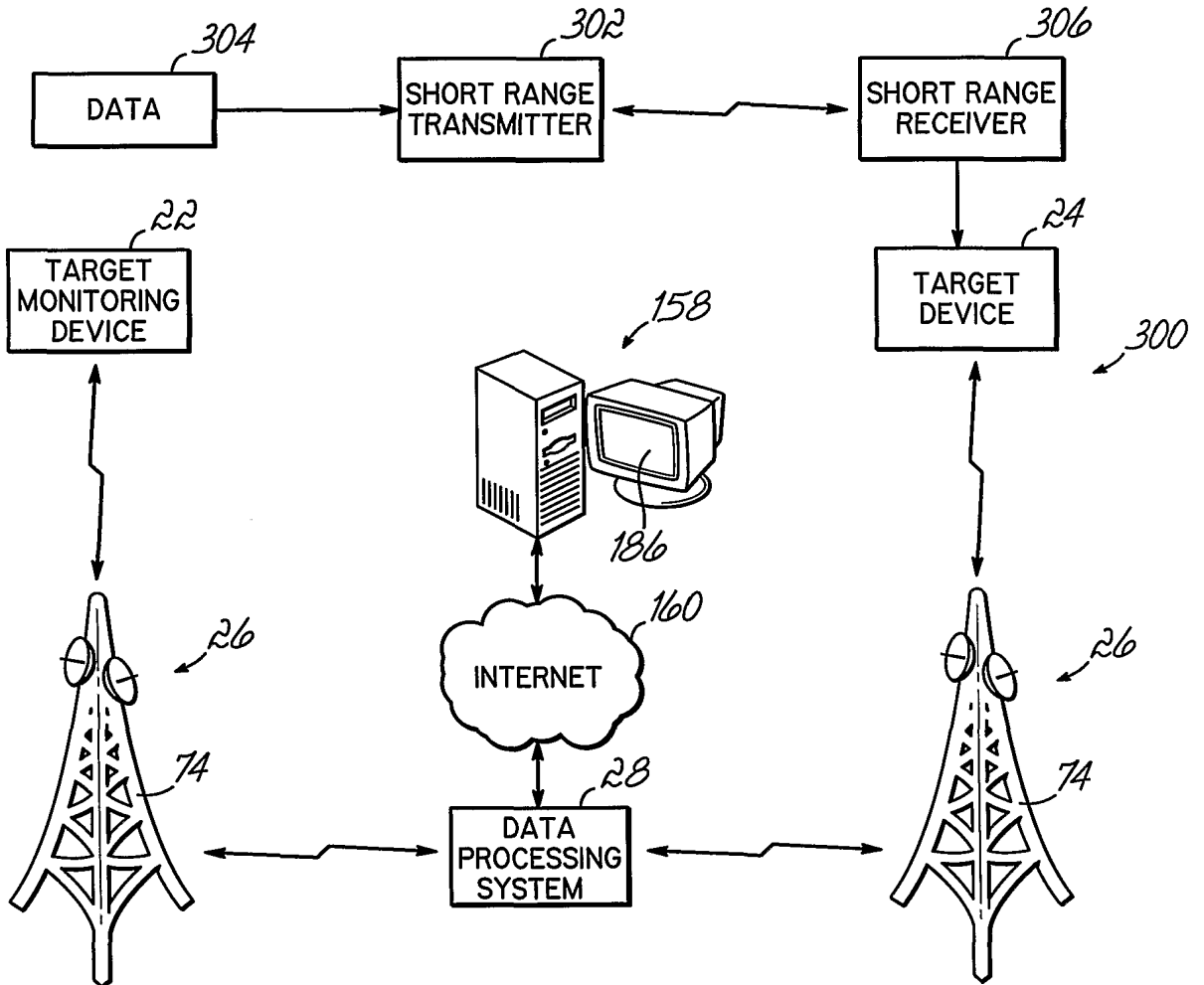


FIG. 13

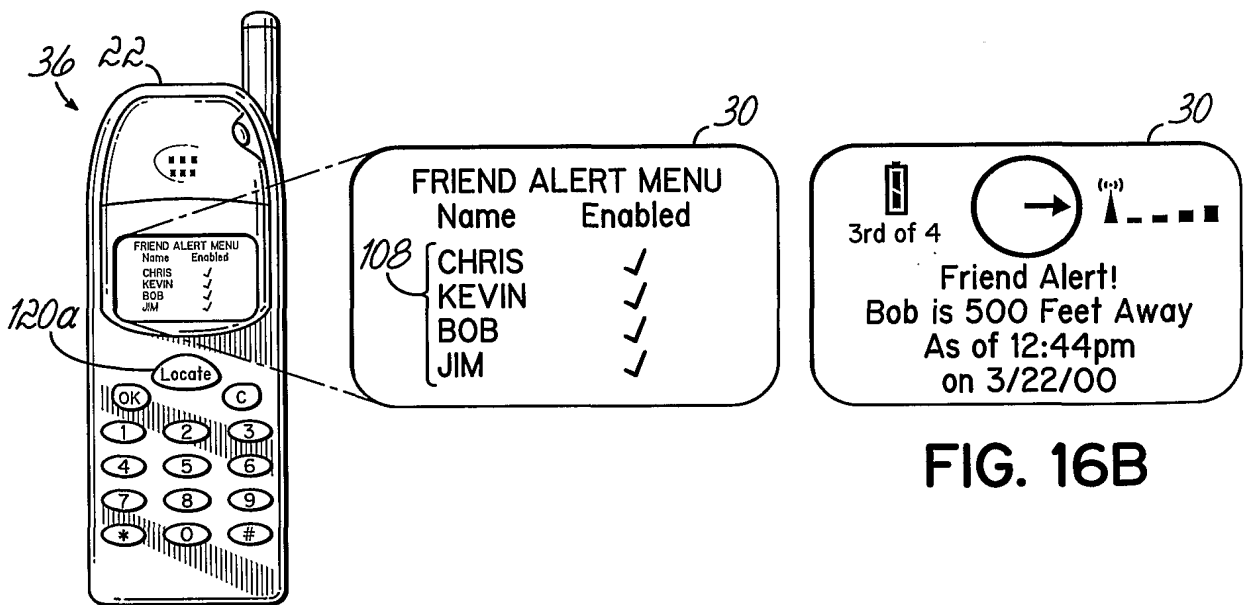


FIG. 16A

FIG. 16B

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	14142664
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	02-NOV-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	23:21:07
<b>Application Type:</b>	Utility under 35 USC 111(a)

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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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IPR2020-01192

2	Foreign Reference	JP2001359147.pdf	930470	no	15
			6192f98dbee6cfd1d6a6e76e65b5f5c10eec1a98		
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599
	Filing Date		2012-01-23
	First Named Inventor	Joseph F. Scalisi	
	Art Unit		2612
	Examiner Name	Phung NGUYEN	
	Attorney Docket Number		LB1-006USD1

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	2	6396403	B1	2002-05-28	Haner	Entire Document
	3	6774797		2004-08-01	Freathy et al.	Entire Document
	4	6998985	B2	2006-02-14	Reisman et al.	Entire Document
	5	7019644	B2	2006-03-28	Barrie	Entire Document
	6	7742774	B2	2010-06-22	Oh Seung et al.	Entire Document
	7	7823073	B2	2010-10-26	Holmes et al.	Entire Document
	8	7831264	B2	2010-11-09	Miegel	Entire Document

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Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
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Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

9	7995994	B2	2011-08-09	Khetawat et al.	Entire Document
10	8010601	B2	2011-08-30	Jennings et al.	Entire Document

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	3	20060223518	A	2006-10-05	Haney	Entire Document
	4	20060229027	A	2006-10-12	Wang et al.	Entire Document
	5	20070200695	A	2007-08-30	Almstrand et al.	Entire Document
	6	20070240212	A	2007-10-11	Matalytski	Entire Document
	7	20070279002	A	2007-12-06	Partovi	Entire Document



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

8	20080021741	A	2008-01-24	Holla et al.	Entire Document
9	20080030345	A	2008-02-07	Austin et al.	Entire Document
10	20090177385	A	2009-07-09	Matas et al.	Entire Document
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Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

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STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

**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.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**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	/Mark Farrell/	Date (YYYY-MM-DD)	2012-11-21
Name/Print	Mark Farrell	Registration Number	45988

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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<b>EFS ID:</b>	14319586
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	27-NOV-2012
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	17:06:47
<b>Application Type:</b>	Utility under 35 USC 111(a)

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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDS.pdf	612599 f126d9a25a9203376ab3dc2135851204b7f31e18	no	6

### Warnings:

### Information:

IPR2020-01192

**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.**



NOTICE OF ALLOWANCE AND FEE(S) DUE

93892 7590 12/05/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

Table with 2 columns: EXAMINER (NGUYEN, PHUNG), ART UNIT (2681), PAPER NUMBER

DATE MAILED: 12/05/2012

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

Table with 7 columns: APPLN. TYPE, SMALL ENTITY, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

93892 7590 12/05/2012  
**Timberline Patent Law Group**  
 108 N. Washington St.  
 Suite 417  
 Spokane, WA 99201

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

_____ (Depositor's name)
_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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13/356,599      01/23/2012      Joseph F. Scalisi      LB1-006USD1      1007

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional      YES      \$885      \$300      \$0      \$1185      03/05/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
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NGUYEN, PHUNG      2681      340-539130

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____</p> <p>(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____</p> <p>3 _____</p>
---	---

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE      (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) :     Individual     Corporation or other private group entity     Government

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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**5. Change in Entity Status (from status indicated above)**

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.     b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/356,599 01/23/2012 Joseph F. Scalisi LB1-006USD1 1007

93892 7590 12/05/2012
Timberline Patent Law Group
108 N. Washington St.
Suite 417
Spokane, WA 99201

EXAMINER

NGUYEN, PHUNG

ART UNIT PAPER NUMBER

2681

DATE MAILED: 12/05/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## Privacy Act Statement

**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 disclosure of these records is required by the Freedom of Information Act.
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 inspection 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.

**Notice of Allowability**

**Application No.**

13/356,599

**Examiner**

PHUNG NGUYEN

**Applicant(s)**

SCALISI ET AL.

**Art Unit**

2681

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- 1.  This communication is responsive to 11/02/12.
- 2.  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.
- 3.  The allowed claim(s) is/are 1-24.
- 4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - 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)).

\* Certified copies not received: \_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- 5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  - 6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_.
    - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
- 7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- 1.  Notice of References Cited (PTO-892)
- 2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3.  Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_
- 4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 5.  Notice of Informal Patent Application
- 6.  Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_ .
- 7.  Examiner's Amendment/Comment
- 8.  Examiner's Statement of Reasons for Allowance
- 9.  Other \_\_\_\_.

## **DETAILED ACTION**

### *Allowable Subject Matter*

1. Claims 1-24 are allowed.
2. The following is an examiner's statement of reasons for allowance:

The instant application is directed to a portable electronic tracking device to monitor location coordinate of one or more objects. Each independent claim identifies the uniquely distinct combination of features including "a battery power monitor configured to selectively activate and deactivate at least one portion of the transceiver circuitry and location tracking circuitry to conserve battery power in response to a signal level of the at least one portion of the receive communication signal". This patentable distinction is included in all independent claims 1, and 15. The closest prior art, Croyle et al. (US 5,862,511) and Lau et al. (US 5,592,173). Croyle et al. disclose vehicle navigation system and method, and Lau et al. disclose GPS receiver having a low power standby mode. The references, either singularly or in combination, fail to anticipate or render the above limitations obvious.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion.*

Art Unit: 2681

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phung Nguyen whose telephone number is 571-272-2968. The examiner can normally be reached on Monday to Friday from 8:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel J. Wu, can be reached on 571-272-2964. The fax phone number for this Group is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is 571-272-2600.

/PHUNG NGUYEN/

Primary Examiner, Art Unit 2681

Date: November 19, 2012

<b>Notice of References Cited</b>	Application/Control No. 13/356,599	Applicant(s)/Patent Under Reexamination SCALISI ET AL.	
	Examiner PHUNG NGUYEN	Art Unit 2681	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,862,511	01-1999	Croyle et al.	701/445
*	B	US-5,592,173	01-1997	Lau et al.	342/357.74
*	C	US-7,612,663	11-2009	Sun, Chun-l	340/539.3
*	D	US-6,774,838	08-2004	Sun, Chun-l	342/357.57
*	E	US-2005/0113124	05-2005	Syrjarinne et al.	455/522
*	F	US-7,123,189	10-2006	Lalik et al.	342/357.31
*	G	US-6,975,941	12-2005	Lau et al.	701/491
*	H	US-7,826,968	11-2010	Huang et al.	701/469
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*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.

<b>Search Notes</b>  	<b>Application/Control No.</b>  13356599	<b>Applicant(s)/Patent Under Reexamination</b>  SCALISI ET AL.
	<b>Examiner</b>  PHUNG NGUYEN	<b>Art Unit</b>  2612

SEARCHED			
Class	Subclass	Date	Examiner
340	539.13,539.21,686.1,636.1	03/17/12	PTN
701	400	03/17/12	PTN

SEARCH NOTES		
Search Notes	Date	Examiner

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
701	400	03/17/12	PTN

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6975941	B1	2005-12-13	Lau et al.	Entire Document
	2	7123189	B2	2006-10-17	Lalik et al.	Entire Document
	3	7826968	B2	2010-11-02	Huang et al.	Entire Document

If you wish to add additional U.S. Patent citation information please click the Add button.

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2001359147	JP	A	2001-12-26	Miwa et al.	Entire Document	<input type="checkbox"/>



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		13356599
Filing Date		2012-01-23
First Named Inventor	Joseph F. Scalisi	
Art Unit		2612
Examiner Name	Phung NGUYEN	
Attorney Docket Number		LB1-006USD1

2	2002222249	JP	A	2002-08-09	Banba et al.	Entire Document	<input type="checkbox"/>
3	2003284123	JP	A	2003-10-03	Fukuda et al.	Entire Document	<input type="checkbox"/>
4	2003529083	JP	A	2003-09-30	I	Entire Document	<input type="checkbox"/>
5	2005210204	JP	A	2005-08-04	Uchida	Entire Document	<input type="checkbox"/>
6	2005223436	JP	A	2005-08-18	Fukushima et al.	Entire Document	<input type="checkbox"/>
7	0163315	WO	A	2001-08-30	Kalthoff Robert et al.	Entire Document	<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button **Add**

**NON-PATENT LITERATURE DOCUMENTS**

**Remove**

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 <sup>5</sup>
	1	<del>"Notice of Reasons for Rejection" mailed April 18, 2012, Japanese Application No. 2000-524880, 4 pages</del>	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

**EXAMINER SIGNATURE**

Examiner Signature	/Phung Nguyen/	Date Considered	11/19/2012
--------------------	----------------	-----------------	------------

\*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.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1


<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.


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**BIB DATA SHEET**
**CONFIRMATION NO. 1007**

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
13/356,599	01/23/2012	340	2681	LB1-006USD1		
<b>APPLICANTS</b>						
Joseph F. Scalisi, Yorba Linda, CA; David Butler, Staffordshire, UNITED KINGDOM; Roger B. Anderson, Arcadia, CA; Desiree Mejia, Redondo Beach, CA; Michael L. Beydler, Irvine, CA;						
<b>** CONTINUING DATA *****</b> This application is a DIV of 11/969,905 01/06/2008 PAT 8,102,256 <span style="float: right;">PTN</span>						
<b>** FOREIGN APPLICATIONS *****</b> <span style="float: right;">PTN</span>						
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY **</b> 02/02/2012						
Foreign Priority claimed	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	<b>STATE OR COUNTRY</b>	<b>SHEETS DRAWINGS</b>	<b>TOTAL CLAIMS</b>	<b>INDEPENDENT CLAIMS</b>
35 USC 119(a-d) conditions met	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initials	CA	3	24	2
Verified and Acknowledged	/PHUNG NGUYEN/ Examiner's Signature					
<b>ADDRESS</b>						
Timberline Patent Law Group 108 N. Washington St. Suite 417 Spokane, WA 99201 UNITED STATES						
<b>TITLE</b>						
APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE						
<b>FILING FEE RECEIVED</b>	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		
650						

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13356599	<b>Applicant(s)/Patent Under Reexamination</b> SCALISI ET AL.
	<b>Examiner</b> PHUNG NGUYEN	<b>Art Unit</b> 2612

ORIGINAL				INTERNATIONAL CLASSIFICATION														
CLASS		SUBCLASS		CLAIMED					NON-CLAIMED									
340		539.13		G	0	8	B	1 / 08 (2006.0)										
CROSS REFERENCE(S)																		
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
2	2	19	18												
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14	14														
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NONE				<b>Total Claims Allowed:</b>			
				24			
(Assistant Examiner)				(Date)			
/PHUNG NGUYEN/ Primary Examiner.Art Unit 2612				11/19/12			
(Primary Examiner)				(Date)			
				O.G. Print Claim(s)		O.G. Print Figure	
				1		3	

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**Courtesy Reminder for  
Application Serial No: 13/356,599**

Attorney Docket No: LB1-006USD1

Customer Number: 93892

Date of Electronic Notification: 12/05/2012

This is a courtesy reminder that new correspondence is available for this application. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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melissa@timberlinepatents.com

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599
	Filing Date		2012-01-23
	First Named Inventor	Joseph F. Scalisi	
	Art Unit		2612
	Examiner Name	Phung NGUYEN	
	Attorney Docket Number		LB1-006USD1

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6078575	A	2000-06-20	Dommety Gopal et al.	Entire Document
	2	6396403	B1	2002-05-28	Haner	Entire Document
	3	6774797		2004-08-01	Freathy et al.	Entire Document
	4	6998985	B2	2006-02-14	Reisman et al.	Entire Document
	5	7019644	B2	2006-03-28	Barrie	Entire Document
	6	7742774	B2	2010-06-22	Oh Seung et al.	Entire Document
	7	7823073	B2	2010-10-26	Holmes et al.	Entire Document
	8	7831264	B2	2010-11-09	Miegel	Entire Document

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Art Unit		2612
Examiner Name	Phung NGUYEN	
Attorney Docket Number		LB1-006USD1

9	7995994	B2	2011-08-09	Khetawat et al.	Entire Document
10	8010601	B2	2011-08-30	Jennings et al.	Entire Document

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	1	20030004776	A	2003-01-02	Perrella et al.	Entire Document
	2	20060176149	A	2006-08-10	Douglas	Entire Document
	3	20060223518	A	2006-10-05	Haney	Entire Document
	4	20060229027	A	2006-10-12	Wang et al.	Entire Document
	5	20070200695	A	2007-08-30	Almstrand et al.	Entire Document
	6	20070240212	A	2007-10-11	Matalytski	Entire Document
	7	20070279002	A	2007-12-06	Partovi	Entire Document

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8	20080021741	A	2008-01-24	Holla et al.	Entire Document
9	20080030345	A	2008-02-07	Austin et al.	Entire Document
10	20090177385	A	2009-07-09	Matas et al.	Entire Document
11	20100216487	A	2010-08-26	Yamaguchi	Entire Document

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	1							<input type="checkbox"/>

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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 <sup>5</sup>
	1		<input type="checkbox"/>

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Examiner Signature	/Phung Nguyen/	Date Considered	12/13/2012
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\*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.



**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

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Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
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Application Number	13356599
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Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

**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.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**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	/Mark Farrell/	Date (YYYY-MM-DD)	2012-11-21
Name/Print	Mark Farrell	Registration Number	45988

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 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 records.
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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.
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Table with columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Row 1: 13/356,599, 01/23/2012, Joseph F. Scalisi, LB1-006USD1, 1007
Row 2: 93892, 7590, 12/19/2012, Examiner: NGUYEN, PHUNG
Row 3: Timberline Patent Law Group, 108 N. Washington St., Suite 417, Spokane, WA 99201, Art Unit: 2681, Paper Number:
Row 4: Notification Date: 12/19/2012, Delivery Mode: 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):

info@timberlinepatents.com
melissa@timberlinepatents.com
mark\_farrell@comcast.net

**Supplemental  
Notice of Allowability**

**Application No.**

13/356,599

**Examiner**

PHUNG NGUYEN

**Applicant(s)**

SCALISI ET AL.

**Art Unit**

2681

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 11/02/12.
2.  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.
3.  The allowed claim(s) is/are 1-24.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - 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)).

\* Certified copies not received: \_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_.
    - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date \_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
5.  Notice of Informal Patent Application
6.  Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_ .
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_.

/PHUNG NGUYEN/  
Primary Examiner, Art Unit 2681

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7292223	B2	2007-11-06	Suprun et al.	Entire Document

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	1	20060161377	A	2006-07-20	Rakkola et al.	Entire Document
	2	20070057068	A	2007-03-15	Tsai	Entire Document
	3	20070103296	A	2007-05-10	Paessel et al.	Entire Document
	4	20080224854	A	2008-09-18	Furey et al.	Entire Document

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
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	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

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Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

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**OR**

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See attached certification statement.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**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	/Mark Farrell/	Date (YYYY-MM-DD)	2013-02-28
Name/Print	Mark Farrell	Registration Number	45988

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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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.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13356599
<b>Filing Date:</b>	23-Jan-2012
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Attorney Docket Number:</b>	LB1-006USD1

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	15127099
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	05-MAR-2013
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	19:55:35
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	7639
Deposit Account	
Authorized User	

### File Listing:

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

1	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDS.pdf	612118	no	4
			550ee5af6195cb319d734d37b00c4a956e7bdf32		
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30623	no	2
			5e1307f8e775a5b502ffce0713f1e73c84aedacc		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			642741		

**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.**

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

93892 7590 12/05/2012  
 Timberline Patent Law Group  
 108 N. Washington St.  
 Suite 417  
 Spokane, WA 99201

**Certificate of Mailing or Transmission**  
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Filed via EFS Web	(Depositor's name)
	(Signature)
	(Date)

APPLICATION NO.	FILED DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,599	01/23/2012	Joseph F. Scalsi	LB1-006USD1	1007

TITLE OF INVENTION: APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$885	\$300	\$0	\$1185	03/05/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, PHUNG	2681	340-539130

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).  
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list  
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 Timberline Patent Law Group  
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)  
 PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Location Based Technologies, Inc.  
 (B) RESIDENCE: (CITY and STATE OR COUNTRY) Irvine, CA

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:  
 Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)  
 A check is enclosed.  
 Payment by credit card ~~XXXXXXXXXXXXXXXXXXXX~~  
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)  
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  
 b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant, a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature: Mark Farrell Date: 3-1-2013  
 Typed or printed name: Mark Farrell Registration No. 45988

This collection of information is required by 37 CFR 1.311. 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13356599
<b>Filing Date:</b>	23-Jan-2012
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Attorney Docket Number:</b>	LB1-006USD1

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl Issue Fee	2501	1	885	885
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

IPR2020-01192

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1185</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	15127161
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	05-MAR-2013
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	20:03:31
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$1185
RAM confirmation Number	7683
Deposit Account	
Authorized User	

### File Listing:

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

1	Issue Fee Payment (PTO-85B)	LB1006USD1IssueFeeTransmittal.PDF	1359618	no	1
			2b1754c1e27c0f378c766527edcc09264a36c150		

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	31912	no	2
			72f46b74d53a87dbcaac6488706c176a21ed4f84		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			1391530		
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**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.**

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7292223	B2	2007-11-06	Suprun et al.	Entire Document

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS						Remove
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20060161377	A	2006-07-20	Rakkola et al.	Entire Document
	2	20070057068	A	2007-03-15	Tsai	Entire Document
	3	20070103296	A	2007-05-10	Paessel et al.	Entire Document
	4	20080224854	A	2008-09-18	Furey et al.	Entire Document

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

	1								<input type="checkbox"/>
--	---	--	--	--	--	--	--	--	--------------------------

If you wish to add additional Foreign Patent Document citation information please click the Add button **Add**

**NON-PATENT LITERATURE DOCUMENTS**

**Remove**

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 <sup>5</sup>
	1		<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*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.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

**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.

Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

None

**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	/Mark Farrell/	Date (YYYY-MM-DD)	2013-02-28
Name/Print	Mark Farrell	Registration Number	45988

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.**

## Privacy Act Statement

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 records.
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.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13356599
<b>Filing Date:</b>	23-Jan-2012
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Attorney Docket Number:</b>	LB1-006USD1

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	15226402
<b>Application Number:</b>	13356599
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1007
<b>Title of Invention:</b>	APPARATUS AND METHOD FOR DETERMINING LOCATION AND TRACKING COORDINATES OF A TRACKING DEVICE
<b>First Named Inventor/Applicant Name:</b>	Joseph F. Scalisi
<b>Customer Number:</b>	93892
<b>Filer:</b>	Mark Farrell/Melissa Nelson
<b>Filer Authorized By:</b>	Mark Farrell
<b>Attorney Docket Number:</b>	LB1-006USD1
<b>Receipt Date:</b>	14-MAR-2013
<b>Filing Date:</b>	23-JAN-2012
<b>Time Stamp:</b>	15:23:55
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	3787
Deposit Account	
Authorized User	

### File Listing:

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

1	Information Disclosure Statement (IDS) Form (SB08)	LB1006USD1IDS.pdf	612118	no	4
			550ee5af6195cb319d734d37b00c4a956e7bdf32		
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30622	no	2
			f7bfc1a95a82e1b6d4e9e561726becf5877846ac		
<b>Warnings:</b>					
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<b>Total Files Size (in bytes):</b>			642740		

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**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.**

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**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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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes details for application 13/356,599 filed 01/23/2012 by Joseph F. Scalisi.

7590 03/20/2013
Timberline Patent Law Group PLLC
9116 E SPRAGUE AVE
# 384
Spokane, WA 99206-3601

Table with 2 columns: EXAMINER, ART UNIT, PAPER NUMBER, NOTIFICATION DATE, DELIVERY MODE. Includes examiner NGUYEN, PHUNG and notification date 03/20/2013.

NOTICE OF NON-COMPLIANT INFORMATION DISCLOSURE STATEMENT

An Information Disclosure Statement (IDS) filed 3/14/13 in the above-identified application fails to meet the requirements of 37 CFR 1.97(d) for the reason(s) specified below. Accordingly, the IDS will be placed in the file, but the information referred to therein has not been considered.

The IDS is not compliant with 37 CFR 1.97(d) because:

- The IDS lacks a statement as specified in 37 CFR 1.97(e).
The IDS lacks the fee set forth in 37 CFR 1.17(p).
The IDS was filed after the issue fee was paid. Applicant may wish to consider filing a petition to withdraw the application from issue under 37 CFR 1.313(c) to have the IDS considered. See MPEP 1308.

Handwritten signature of Amanda Swisher

571-272-4200 or 1-888-786-0101
Application Assistance Unit
Office of Data Management



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes application details for 13/356,599 and examiner information for NGUYEN, PHUNG.

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):

info@timberlinepatents.com
melissa@timberlinepatents.com



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<b>APPLICATION NO./ CONTROL NO.</b>	<b>FILING DATE</b>	<b>FIRST NAMED INVENTOR / PATENT IN REEXAMINATION</b>	<b>ATTORNEY DOCKET NO.</b>
13/356,599	23 January, 2012	SCALISI ET AL.	LB1-006USD1

Timberline Patent Law Group PLLC 9116 E SPRAGUE AVE # 384 Spokane, WA 99206-3601	<b>EXAMINER</b>	
	PHUNG NGUYEN	
	<b>ART UNIT</b>	<b>PAPER</b>
	2681	20130312

DATE MAILED:

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

Commissioner for Patents

The IDS filed on 03/05/20013 has been considered.

/PHUNG NGUYEN/  
Primary Examiner, Art Unit 2681

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7292223	B2	2007-11-06	Suprun et al.	Entire Document

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	1	20060161377	A	2006-07-20	Rakkola et al.	Entire Document
	2	20070057068	A	2007-03-15	Tsai	Entire Document
	3	20070103296	A	2007-05-10	Paessel et al.	Entire Document
	4	20080224854	A	2008-09-18	Furey et al.	Entire Document

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13356599	
	Filing Date		2012-01-23	
	First Named Inventor	Joseph F. Scalisi		
	Art Unit		2612	
	Examiner Name	Phung NGUYEN		
	Attorney Docket Number		LB1-006USD1	

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**NON-PATENT LITERATURE DOCUMENTS** **Remove**

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 <sup>5</sup>
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**EXAMINER SIGNATURE**

Examiner Signature	/Phung Nguyen/	Date Considered	03/12/2013
--------------------	----------------	-----------------	------------

\*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.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	13356599
Filing Date	2012-01-23
First Named Inventor	Joseph F. Scalisi
Art Unit	2612
Examiner Name	Phung NGUYEN
Attorney Docket Number	LB1-006USD1

**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.
- Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- None

**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	/Mark Farrell/	Date (YYYY-MM-DD)	2013-02-28
Name/Print	Mark Farrell	Registration Number	45988

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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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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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/356,599	04/16/2013	8421618	LB1-006USD1	1007

93892 7590 03/27/2013  
Timberline Patent Law Group PLLC  
9116 E SPRAGUE AVE  
# 384  
Spokane, WA 99206-3601

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Joseph F. Scalisi, Yorba Linda, CA;  
David Butler, Staffordshire, UNITED KINGDOM;  
Roger B. Anderson, Arcadia, CA;  
Desiree Mejia, Redondo Beach, CA;  
Michael L. Beydler, Irvine, CA;

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Substitute for form 1449A/PTO			
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		<i>Complete if Known</i>	
		Application Number	13/356,599
		Filing Date	January 23, 2012
		First Named Inventor	Scalisi, Joseph
		Art Unit	Unknown
Examiner Name	Unknown		
Sheet	2	of	8
Attorney Docket No: LB1-006USD1			

US PATENT DOCUMENTS					
Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Filing Date If Appropriate
		US-20050248459	11/10/2005	Bonalle, David S., et al.	
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		US-20080171559	07/17/2008	Frank, Scott et al.	
		US-20080172173	07/17/2008	Chang, Eric et al.	

Change(s) applied to document, /C.H./ 3/25/2013

EXAMINER /Phung Nguyen/ DATE CONSIDERED 07/19/2012

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 \* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional) 2 Applicant is to place a check mark here if English language Translation is attached