

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT8300525

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
Name		Execution Date
BLUE UMBRELLA LLC		11/29/2023
RECEIVING PARTY DATA		
Name:	GAMBA GROUP HOLDINGS LLC	
Street Address:	8273 NW 127 LN	
City:	PARKLAND	
State/Country:	FLORIDA	
Postal Code:	33076	
PROPERTY NUMBERS Total: 19		
Property Type	Number	
Patent Number:	7899583	
Patent Number:	8836580	
Patent Number:	8896485	
Patent Number:	7924149	
Patent Number:	8866673	
Patent Number:	9020687	
Patent Number:	8941485	
Patent Number:	9374673	
Patent Number:	9204257	
Patent Number:	9491584	
Patent Number:	9602193	
Patent Number:	9204251	
Patent Number:	9420423	
Patent Number:	9538332	
Patent Number:	9674684	
Patent Number:	9772193	
Patent Number:	9961507	
Patent Number:	10470013	
Patent Number:	10117078	

CORRESPONDENCE DATA**Fax Number:**

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 9542574319**Email:** umendelson@gmail.com**Correspondent Name:** EHUD MENDELSON**Address Line 1:** 8273 NW 127 LN**Address Line 4:** PARKLAND, FLORIDA 33076

ATTORNEY DOCKET NUMBER:	BLU2GAMBA PATENTS1-19
NAME OF SUBMITTER:	EHUD MENDELSON
SIGNATURE:	/EHUD MENDELSON/
DATE SIGNED:	11/29/2023
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 4

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source=Patent assignment blue to gamba#page4.tif

PATENTS ASSIGNMENT AGREEMENT

THIS AGREEMENT is made this day of November 27, 2023, by and between Blue Umbrella llc represent by Ehud Mendelson (the "Assignor"), having its primary place of business at 8273 NW 127 Ln. Parkland Florida 33076 , and Gamba Group Holdings(the "Assignee") having its primary place of business at 8273 NW 127 Ln. Parkland, Florida 33076 (collectively the "Parties").

WHEREAS, Licensor is has invented RF Beacon and Method of use (the "Invention"), and has been granted United States Letters Patents for said invention, Patent No- .See Attach A (the "Patent"), granted on the patent application filed with the United States Patent and Trademark Office.

WHEREAS, Assignee wishes to acquire all right, title and interest in the Patent, and Assignor wishes to sell its interest in the Patent to Assignee.

NOW THEREFORE, in consideration of the mutual promises, covenants, warranties, and other good and valuable consideration set forth herein, and in accordance with applicable law, the Parties hereby agree as follows:

1. *Assignment.* Assignor hereby assigns to Assignee, and its successors, representatives and assigns, all right, title and interest in the Patent including all reexaminations, extensions and reissues thereof. Assignor hereby requests the Commissioner of Patents of the United States to record this assignment of all right, title and interest in the Patent to Assignee.
2. *Payment.* In consideration of the assignment of the Patent pursuant to this Agreement, and of the promises and covenants contained herein, Assignee shall pay to Assignor a fee in the amount Set in Attachment A of this agreement, payable upon execution of sale or licenses of a patent or patents from the list attach A to this Agreement, until such execution will take place it is agree that the Assignor Ehud Mendelson payment/fee will be conceders as a loan to the Gamba Group Holdings llc in the dynamic amount set in the attachment A. Until such execution of sale or license will take place, Ehud Mendelson will receive a personal loan to his business account in the USA (Db. Blue Umbrella and or search4parking bank account), payment for the loan will payable upon execution of sale or licenses of a patent or patents from the list attach A to this Agreement.

3. *Assignor's Representations and Warranties.* Assignor hereby represents and warrants
- i) that it has the legal right and authority to execute this Agreement, and to validly assign the entire interest in the Patent to Assignee,
 - ii) that it has not executed any other agreement that would conflict with the terms of this Agreement, nor shall it execute any such agreement in the future, and
 - iii) that to the best of Assignor's knowledge, the Patent is valid and enforceable as of the date of this Agreement. Assignor makes no representations or warranties as to the validity or enforceability of the Patent subsequent to the date of this Agreement.
4. *Patent Status.* Assignee hereby acknowledges that any finding or ruling subsequent to the date of this Agreement that the Patent is invalid or unenforceable shall not give rise to a cause of action against Assignor under this Agreement.
5. *Further Actions.* Assignor hereby agrees to execute any further agreements and to take any further actions necessary to aid Assignee in perfecting its interest in the Patent and in enforcing any and all protections or privileges deriving from the Patent.
6. *Counterparts.* This Agreement may be executed in several counterparts, each of which shall constitute an original and all of which, when taken together, shall constitute one agreement.
7. *Severability.* If any part or parts of this Agreement shall be held unenforceable for any reason, the remainder of this Agreement shall continue in full force and effect. If any provision of this Agreement is deemed invalid or unenforceable by any court of competent jurisdiction, and if limiting such provision would make the provision valid, then such provision shall be deemed to be construed as so limited.
8. *Notice.* Any notice required or otherwise given pursuant to this Agreement shall be in writing and mailed certified return receipt requested, postage prepaid, or delivered by overnight delivery service, addressed as follows:

If to Assignor: Blue Umbrella LLC by her president Ehud Mendelson 8273 NW 127 Ln.
Parkland, Florida 33076

If to Assignee: Gamba Group Holdings LLC having its primary place of business at 8273
NW 127 Ln. Parkland, Florida 33076

9 *Headings.* The headings for section herein are for convenience only and shall not affect the meaning of the provisions of this Agreement.

10. *Entire Agreement.* This Agreement constitutes the entire agreement between Assignor and Assignee, and supersedes any prior understanding or representation of any kind preceding the date of this Agreement. There are no other promises, conditions, understandings or other agreements, whether oral or written, relating to the subject matter of this Agreement.

Attach A List of patents assignment:

Patents #:	Application #:
7899583	US11/396,843
8836580	US11/429,864
8896485	US11/472,706
7924149	US12/069,899
8866673	US12/587,042
9020687	US12/930,735
8941485	US12/932,811
9374673	US13/135,421
9204257	US13/135,421
9491584	US14/285,332
9602193	US14/285,273
9204251	US14/285,209
9420423	US15/086,028
9538332	US15/237,727
9674684	US15/397,685
9772193	US15/403,146
9961507	US15/687,445
10470013	US15/953,389
10117078	US15/972,074

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed the day and year first above written.

ASSIGNOR

Ehud Mendelson

Signature

Print Name

ASSIGNEE

Gamba Group Holdings President

Signature

Print Name

State of FLORIDA

County of BROWARD

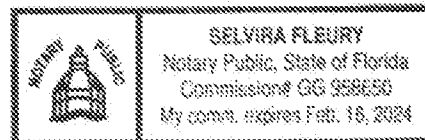
I, the undersigned, a Notary Public in and for said County, in the State aforesaid, DO HEREBY CERTIFY THAT EHUD MENDELSON personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that EHUD MENDELSON signed, sealed and delivered the said instrument as his/her/their free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 27th day of November, 2023

Signature of Notary Public

(Seal)

Printed Name of Notary



My commission expires on February 16, 2024

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT5756053

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
Name		Execution Date
GAMBA GROUP LIMITED		10/06/2019
RECEIVING PARTY DATA		
Name:	BLUE UMBRELLA LLC	
Street Address:	11190 HERON BAY BLVD SUITE 916	
City:	CORAL SPRINGS	
State/Country:	FLORIDA	
Postal Code:	33076	
PROPERTY NUMBERS Total: 16		
Property Type	Number	
Patent Number:	7899583	
Patent Number:	7924149	
Patent Number:	8836580	
Patent Number:	8866673	
Patent Number:	8896485	
Patent Number:	8941485	
Patent Number:	9020687	
Patent Number:	9204251	
Patent Number:	9204257	
Patent Number:	9374673	
Patent Number:	9420423	
Patent Number:	9491584	
Patent Number:	9538332	
Patent Number:	9602193	
Patent Number:	9674684	
Patent Number:	9772193	
CORRESPONDENCE DATA		
Fax Number:		
Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.		

Phone: 9542574319
Email: umen79@yahoo.com
Correspondent Name: EHUD MENDELSON
Address Line 1: 11190 HERON BAY BLVD SUITE 916
Address Line 4: CORAL SPRINGS, DELAWARE 33076

ATTORNEY DOCKET NUMBER:	ASSIGNMENT GAMBA TO BLU8X
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NAME OF SUBMITTER:	EHUD MENDELSON
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SIGNATURE:	/ehud mendelson/
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DATE SIGNED:	10/06/2019
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	This document serves as an Oath/Declaration (37 CFR 1.63).
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Total Attachments: 3

source=ASSIGNMENT of patents from gamba group to blue umbrella sign and ready#page1.tif

source=ASSIGNMENT of patents from gamba group to blue umbrella sign and ready#page2.tif

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ASSIGNMENT

WHEREAS, I:

Ehud Mendelson President of **Gamba Group Limited**, a For Profit Corporation organized and existing under the laws of the state of Malta, and having an office and place of business at **262 Triq San Alber, Gzira, Malta, GZR 1152**, represent by **Ehud Mendelson** president of the company which residing, respectively, at: **11190 Heron Bay Blvd. Suite 916, Coral Springs, FL, 33076**,

Which own the patents listed as follow:

<u>Patent#</u>	<u>Application #</u>
<u>7899583</u>	<u>11396843</u>
<u>7924149</u>	<u>12069899</u>
<u>8836580</u>	<u>11429864</u>
<u>8866673</u>	<u>12587042</u>
<u>8896485</u>	<u>11472706</u>
<u>8941485</u>	<u>12932811</u>
<u>9020687</u>	<u>12930735</u>
<u>9204251</u>	<u>14285209</u>
<u>9204257</u>	<u>14285273</u>
<u>9374673</u>	<u>13135421</u>
<u>9420423</u>	<u>15086028</u>
<u>9491584</u>	<u>14285332</u>
<u>9538332</u>	<u>15237727</u>
<u>9602193</u>	<u>14285406</u>
<u>9674684</u>	<u>15397685</u>
<u>9772193</u>	<u>15403146</u>

WHEREAS, **Blue Umbrella Limited Liability company**, a For Profit Corporation organized and existing under the laws of the state of **Nevada** and having an office and place of business at **11190 Heron Bay Blvd. Suite 916, Coral Springs, FL, 33076**,

, is desirous of acquiring the entire interest in said Patents, said United States patents which listed above (page 1) and Currently owns by Gamba Group Limited, and in any patents which may issue thereon

NOW, THEREFORE,

be it known that for and in consideration of **Blue Umbrella Limited Liability company**, and other good and valuable consideration, I do hereby sell, assign, and transfer unto **Blue Umbrella Limited Liability company**, its successors, assigns, and legal representatives, all right, title, and interest in and to said patents listed in page 1 and any improvements thereon for all countries of the world, and in and to said application, including any continuations and divisions thereof, and any substitute applications therefor, and any patents which may issue thereon, and any reissues of the same; and all right, title, and interest in and to every patents application filed on said patents listed in page 1 in any other country, including renewals, revivals, continuations, and divisions thereof, and any substitute applications therefor, and any and all patents which may issue thereon, and any reissues and extensions of the same; and we hereby authorize and request competent authorities to grant and issue any and all patents on said listed in page 1 to **Blue Umbrella Limited Liability company** as the assignee of the entire interest therein; and we further agree to execute upon request of the assignee such additional documents, if any, as are necessary and proper to secure patents protection on said patents throughout all countries of the world, and otherwise to give full effect to and perfect the rights of the assignee under this Assignment.

In Testimony Whereof, I have hereunto signed my name on
The dates indicated hereinafter:

09/20/19
Date

Ehud Mendelson
Ehud Mendelson

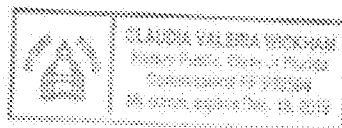
State of Florida
Country of Barbados

Before me a Notary Public for said county, personally appeared Ehud Mendelson, to me know and known to me to be the person who executed the foregoing instrument and acknowledged it to be a free act and deed.

Witness my hand and seal

September, 20th, 2019.

Claudia Valera
Notary Public



[Notary Seal]

My Commission expires:

Dec. 18, 2019



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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/403,146	09/26/2017	9772193	MEN-17-002	4885

31877 7590 09/06/2017
ALLEN D. HERTZ
ALLEN D HERTZ, P.A.
12784 TULIPWOOD CIRCLE
BOCA RATON, FL 33428

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):

Ehud MENDELSON, Coral Springs, FL;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
15403146	10-Jan-2017	Ehud MENDELSON	MEN-17-002	4885

TITLE OF INVENTION :

VEHICLE BEACON AND METHOD OF USE

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Small	Utility under 35 USC 111(a)	2648	041200	APRIL GONZALES
Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
\$480	\$0	\$480	11-Oct-2017	\$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
31877 ALLEN D. HERTZ ALLEN D HERTZ, P.A. 12784 TULIPWOOD CIRCLE BOCA RATON FL 33428 UNITED STATES 561-716-3915 Patents@AllenHertz.com	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☒ Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status**Change in Entity Status**

Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.

Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.



Applicant asserting small entity status. See 37 CFR 1.27.

Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.



Applicant changing to regular undiscounted fee status.

Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.



Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

☒ Issue Fee

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ Publication Fee

☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

☐ Advance Order - # of copies _____

☐ If in **addition** to the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number _____.
The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

1. Allen D. Hertz, P. A.
2. Allen D. Hertz
3.

5.Assignee Name(s) and Residence Data To Be Printed

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.

Name	City	State	Country	Category

6.Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/Allen D Hertz/	Date	08-19-2017
Name	Allen D. Hertz	Registration Number	50942

FEE ADDRESS INDICATION FORM

Application Number	15403146	Art Unit	2648
Filing Date	10-Jan-2017	Examiner Name	APRIL GONZALES
First Name Inventor	Ehud MENDELSON	Attorney Doc. Number	MEN-17-002

INSTRUCTIONS: In order for the fee address identified on this form to be effective, the issue fee must have been paid for the application listed on this form. Only an address represented by a customer number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. For more information on customer numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

Please recognize as the Fee Address under the provisions of 37 CFR 1.363 the address associated with:

Customer Number:	31877
------------------	-------

Signature :

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application.

Signature	/Allen D Hertz/	Date	08-19-2017
Name	Allen D. Hertz	Registration Number	50942

Electronic Patent Application Fee Transmittal

Application Number:	15403146			
Filing Date:	10-Jan-2017			
Title of Invention:	VEHICLE BEACON AND METHOD OF USE			
First Named Inventor/Applicant Name:	Ehud MENDELSON			
Filer:	Allen D. Hertz			
Attorney Docket Number:	MEN-17-002			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPL ISSUE FEE	2501	1	480	480
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

Electronic Acknowledgement Receipt

EFS ID:	30128651
Application Number:	15403146
International Application Number:	
Confirmation Number:	4885
Title of Invention:	VEHICLE BEACON AND METHOD OF USE
First Named Inventor/Applicant Name:	Ehud MENDELSON
Customer Number:	31877
Filer:	Allen D. Hertz
Filer Authorized By:	
Attorney Docket Number:	MEN-17-002
Receipt Date:	19-AUG-2017
Filing Date:	10-JAN-2017
Time Stamp:	14:35:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 480
RAM confirmation Number	082117INTEFSW14345901
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Web85b.pdf	45476	no	2
			c98c6835969721a75d81e6f6cc825f9f332268cd		
Warnings:					
Information:					
2	Maintenance Fee Address Change	web85feeaddress.pdf	32483	no	1
			c4e2213c396c47232b564ad123f82d64e6b6b3c1		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31746	no	2
			5374e7291234b9623370d43cfa85a57199096bed		
Warnings:					
Information:					
Total Files Size (in bytes):			109705		
<p>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.</p> <p><u>New Applications Under 35 U.S.C. 111</u> 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.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> 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.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

31877 7590 07/11/2017
ALLEN D. HERTZ
ALLEN D HERTZ, P.A.
12784 TULIPWOOD CIRCLE
BOCA RATON, FL 33428

EXAMINER

GONZALES, APRIL GUZMAN

ART UNIT

PAPER NUMBER

2648

DATE MAILED: 07/11/2017

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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15/403,146

01/10/2017

Ehud MENDELSON

MEN-17-002

4885

TITLE OF INVENTION: VEHICLE BEACON AND METHOD OF USE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	10/11/2017

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 ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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.

31877 7590 07/11/2017
ALLEN D. HERTZ
ALLEN D HERTZ, P.A.
12784 TULIPWOOD CIRCLE
BOCA RATON, FL 33428

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.
15/403,146	01/10/2017	Ehud MENDELSON	MEN-17-002	4885

TITLE OF INVENTION: VEHICLE BEACON AND METHOD OF USE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	10/11/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
GONZALES, APRIL GUZMAN	2648	455-041200

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 _____
- (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:

- ☐ 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. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/403,146	01/10/2017	Ehud MENDELSON	MEN-17-002	4885

31877 7590 07/11/2017
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12784 TULIPWOOD CIRCLE
BOCA RATON, FL 33428

EXAMINER

GONZALES, APRIL GUZMAN

ART UNIT PAPER NUMBER

2648

DATE MAILED: 07/11/2017

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

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B 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.

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. 15/403,146	Applicant(s) MENDELSON, EHUD	
	Examiner APRIL G. GONZALES	Art Unit 2648	AIA (First Inventor to File) Status Yes

-- 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 01/10/2017.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
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 1-21. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some *c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* 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. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ 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).
6. ☐ 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) | 5. ☐ Examiner's Amendment/Comment |
| 2. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>01/10/2017</u> | 6. ☒ Examiner's Statement of Reasons for Allowance |
| 3. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. ☐ Other _____. |
| 4. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/APRIL G GONZALES/
Primary Examiner, Art Unit 2648

DETAILED ACTION

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Information Disclosure Statement

The information disclosure statement submitted on 01/10/2017 has been considered by the Examiner and made of record in the application file.

Allowable Subject Matter

Claims 1-21 are allowed.

The following is an examiner's statement of reasons for allowance:

Consider **claim 1**, the best prior art of record found during the examination of the present application, **Suman et al. (US 6,028,537 herein Suman)**, fails to specifically teach, suggest, or disclose a method of utilizing at least one beacon for conveying desired information, the method comprising steps of:

integrating a Radio Frequency (RF) beacon into a vehicle, the RF beacon being a communication device configured to transit a beacon signal detectable by a baseband subsystem of a mobile device located within a communication range of the respective beacon;

encoding desired information in a naming packet of a beacon signal;

broadcasting the encoded desired information in the naming packet of the beacon signal;

and

decoding the encoded desired information an authorize wireless scanning device; and

utilizing the decoded encoded desired information to initiate at least one of telematics and location base services (LBS) applications.

Suman teaches a vehicle communication and control system that includes a transceiver for sending and receiving RF signals, a processor coupled to the transceiver, a location identifying sensor coupled to the processor for supplying vehicle location data, a user interface coupled to the processor for providing information to a user and for enabling a user input commands to be executed by the processor, and a vehicle accessory interface for coupling the processor to a vehicle accessory control circuit to enable the processor to issue commands to a vehicle accessory. Some of the functions include establishing a two-way communication link, requesting and providing location-specific information, enabling remote tracking of the vehicle, issuing an emergency request or a request for roadside assistance, requesting and receiving navigational information, remote control of vehicle functions, enabling remote diagnostics of the vehicle, and enabling reprogramming of various vehicle accessories and components (Abstract). These teachings of Suman differ and fall short of the present application, therefore claim 1 is considered novel and non-obvious over the prior art and therefore is allowed.

Claims 2-11 depend upon allowable claim 1, therefore these claims are also allowed.

Consider **claim 12**, the best prior art of record found during the examination of the present application, **Suman et al. (US 6,028,537 herein Suman)**, fails to specifically teach, suggest, or disclose a method of utilizing a Bluetooth transceiver for conveying desired information, the method comprising steps of:

employing the Bluetooth transceiver integrated within a vehicle, the Bluetooth transceiver configured to transmit a Bluetooth signal detectable by a Bluetooth circuit of

Art Unit: 2648

a mobile device located within a communication range of the respective Bluetooth transceiver; registering an exact parking space location of the vehicle on the mobile device using information provided by the Bluetooth transceiver; and

subsequently using the mobile device to provide navigation to the parking space location where the vehicle is parked.

Suman teaches a vehicle communication and control system that includes a transceiver for sending and receiving RF signals, a processor coupled to the transceiver, a location identifying sensor coupled to the processor for supplying vehicle location data, a user interface coupled to the processor for providing information to a user and for enabling a user input commands to be executed by the processor, and a vehicle accessory interface for coupling the processor to a vehicle accessory control circuit to enable the processor to issue commands to a vehicle accessory. Some of the functions include establishing a two-way communication link, requesting and providing location-specific information, enabling remote tracking of the vehicle, issuing an emergency request or a request for roadside assistance, requesting and receiving navigational information, remote control of vehicle functions, enabling remote diagnostics of the vehicle, and enabling reprogramming of various vehicle accessories and components (Abstract). These teachings of Suman differ and fall short of the present application, therefore claim 12 is considered novel and non-obvious over the prior art and therefore is allowed.

Claims 13-21 depend upon allowable claim 12, therefore these claims are also allowed.

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

Art Unit: 2648

fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to APRIL G. GONZALES whose telephone number is (571)270-1101. The examiner can normally be reached on Monday - Friday, 7:00 a.m. - 3:30 p.m., EST.

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

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Wesley L. Kim can be reached on 571-272-7867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

Application/Control Number: 15/403,146
Art Unit: 2648

Page 6

/APRIL G GONZALES/
Primary Examiner, Art Unit 2648
07/10/2017

Notice of References Cited	Application/Control No. 15/403,146		Applicant(s)/Patent Under Reexamination MENDELSON, EHUD	
	Examiner APRIL G. GONZALES		Art Unit 2648	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2006/0003775 A1	01-2006	Bull; Jeffrey F.	G01S5/0205	455/456.1
*	B	US-2010/0120447 A1	05-2010	Anderson; Robert J.	H04W64/003	455/456.1
*	C	US-2012/0023171 A1	01-2012	Redmond; Scott	H04M1/7253	709/205
*	D	US-2012/0084364 A1	04-2012	SIVAVAKEESAR; SIVARATHALINGHAM	H04L12/1818	709/205
*	E	US-2012/0188101 A1	07-2012	Ganot; Zvi	G07B15/02	340/932.2
*	F	US-2013/0113936 A1	05-2013	Cohen; Daniel	G07B15/02	348/148
*	G	US-8,705,527 B1	04-2014	Addepalli; Sateesh K.	H04W4/046	370/389
*	H	US-8,770,477 B2	07-2014	Hefetz; Guy	G06Q20/32	235/380
*	I	US-8,896,485 B2	11-2014	Mendelson; Ehud	G01C21/206	342/463
*	J	US-9,204,251 B1	12-2015	Mendelson; Ehud	G08G1/14	1/1
*	K	US-9,538,332 B1	01-2017	Mendelson; Ehud	H04W4/023	1/1
*	L	US-9,553,626 B2	01-2017	Callaway, Jr.; Edgar H.	H04W52/0261	1/1
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC 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.

PTO/SB/08a (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 1 of 5

Complete if Known

Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 3,114,128	12-1963	Ljungman	
		US- 3,130,298	04-1964	Schwarz	
		US- 3,158,836	11-1964	McCauley	
		US- 3,166,732	01-1965	Ljungman	
		US- 3,867,615	02-1975	Sioufi	
		US- 4,491,970	01-1985	LaWhite, et al.	
		US- 5,195,126	03-1993	Carrier, et al.	
		US- 5,250,955	10-1993	Major, Harvey W.	
		US- 5,272,483	12-1993	Kato	
		US- 5,293,163	03-1994	Kakihara	
		US- 5,305,370	04-1994	Kearns, et al.	
		US- 5,319,363	06-1994	Welch, et al.	
		US- 5,383,127	01-1995	Shibata	
		US- 5,416,712	05-1995	Geier	
		US- 5,432,508	07-1995	Jackson	
		US- 5,442,348	08-1995	Mushell	
		US- 5,454,461	10-1995	Jacobs	
		US- 5,485,520	01-1996	Chaum, et al.	
		US- 5,504,482	04-1996	Schreder	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁵
		JP 9126804 A	05-1997	YAMAZAKI, MNORU		

Examiner
Signature

/APRIL G GONZALES/

Date
Considered

07/10/2017

*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 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, 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 (1-800-786-9199) and select option 2.

PTO/SB/08a (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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

Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 2 of 5

Complete if Known

Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,568,535	10-1996	Sheffer, et al.	
		US- 5,606,506	02-1997	Kyrtos	
		US- 5,638,279	06-1997	Kishi, et al.	
		US- 5,652,570	07-1997	Lepkofker, Robert	
		US- 5,712,619	01-1998	Simkin, et al.	
		US- 5,742,233	04-1998	Hoffman, et al.	
		US- 5,771,001	06-1998	Cobb, Marlon J.	
		US- 5,798,733	08-1998	Ethridge, Jeffrey Noel	
		US- 5,838,237	11-1998	Revell, et al.	
		US- 5,873,040	02-1999	Dunn, et al.	
		US- 5,910,782	06-1999	Schmitt, et al.	
		US- 5,929,777	07-1999	Reynolds, Kevin T.	
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		US- 5,995,040	11-1999	Issler, et al.	
		US- 6,028,537	02-2000	Suman, et al.	
		US- 6,072,396	06-2000	John J. Gaukel	
		US- 6,340,928	01-2002	McCurdy, Rogger A.	
		US- 6,445,937	09-2002	daSilva; Ivan Pereira	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁵

Examiner
Signature

/APRIL G GONZALES/

Date
Considered

07/10/2017

*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 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, 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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PTO/SB/08a (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 3 of 5

Complete if Known

Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

U. S. PATENT DOCUMENTS

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		US- 6,535,127	03-2003	Taylor, Elizabeth Anne	
		US- 6,636,732	10-2003	Boling, et al.	
		US- 6,738,628	05-2004	McCall, et al.	
		US- 6,807,564	10-2004	Zellner, et al.	
		US- 6,970,101	11-2005	Squire, et al.	
		US- 7,026,954	04-2006	Slemmer, et al.	
		US- 7,031,875	04-2006	Ellenby, et al.	
		US- 7,034,678	04-2006	Burkley, et al.	
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		US- 7,245,216	07-2007	Burkley, et al.	
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		US- 7,743,337	06-2010	Maeda, et al.	
		US- 7,907,931	03-2011	Hartigan, et al.	
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		US- 8,041,330	10-2011	Garin, Lionel Jacques	
		US- 8,126,960	02-2012	Obradovich, et al.	
		US- 8,705,527	04-2014	Addepalli; Sateesh K.	
		US- 8,770,477	07-2014	Hefetz, Guy	
		US- 8,896,485	11-2014	Mendelson, Ehud	

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

Sheet 4 of 5

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Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

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		US- 2001/0026223	10//2001	Menard, et al.	
		US- 2002/0075941	06-2002	Souissi, Slim	
		US- 2002/0129138	09-2002	Carter, Trent R.	
		US- 2002/0131386	09-2002	Gwon, Youngjune L.	
		US- 2003/0018708	01-2003	Hlasny, Daryl	
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		US- 2003/0045280	03-2003	Simons, Paul R.	
		US- 2003/0050039	03-2003	Baba, et al.	
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		US- 2003/0148771	08-2003	de Verteuil, Andre Laurent	
		US- 2004/0066917	04-2004	Yasukawa, et al.	
		US- 2004/0072583	04-2004	Weng, Yuan Sung	
		US- 2004/0239498	12-2004	Miller, John D.	
		US- 2005/0021369	01-2005	Cohen, et al.	
		US- 2005/0070315	03-2005	Rai, et al.	
		US- 2005/0096070	05-2005	Kanevsky, et al.	
		US- 2005/0111630	05-2005	Potorny, et al.	
		US- 2005/0187819	08-2005	Johnson, Michael Joseph	

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Sheet 5 of 5

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Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
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		US- 2005/0221858	10-2005	Hoddie, J. Peter	
		US- 2006/0033641	02-2006	Jaupitre, et al.	
		US- 2006/0095331	05-2006	O'Malley, et al.	
		US- 2006/0122767	06-2006	Athalye, Ravi G.A.	
		US- 2006/0163349	07-2006	Neugebauer, Charles F.	
		US- 2006/0253226	11-2006	Mendelson, Ehud	
		US- 2007/0032225	02-2007	Konicek, et al.	
		US- 2008/0227473	09-2008	Haney, Richard D.	
		US- 2008/0280624	11-2008	Wrappe, Thomas Keith	
		US- 2009/0006418	01-2009	O'Malley, Matt	
		US- 2010/0142402	06-2010	Boldyrev; Sergey	
		US- 2012/0023171	01-2012	Redmond; Scott	
		US- 2012/0084364	04-2012	Sivapathalingham, Sivavakasesar	
		US- 2012/0188101	07-2012	Ganot, Zvi	
		US- 2013/0113936	05-2013	Cohen, et al.	
		US-			
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FOREIGN PATENT DOCUMENTS

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	723	"6028537"	US-PGPUB; USPAT	OR	OFF	2017/07/10 13:51
L2	0	((beacon) with (conveying adj desired adj information) with (radio adj frequency adj beacon) with (vehicle) with (RF adj beacon) with (communication adj device) with (beacon adj signal adj detectable) with (baseband adj subsystem) with (mobile adj device) with (communication adj range) with (respective adj beacon) with (encoding adj desired adj information) with (naming adj packet) with (beacon adj signal) with (authorize adj wireless adj scanning adj device) with (telematics) with (location adj base adj services adj application) with (LBS))	US-PGPUB; USPAT	OR	OFF	2017/07/10 14:11
L5	0	((beacon) with (conveying adj desired adj information) with (radio adj frequency adj beacon) with (vehicle) with (RF adj beacon) with (communication adj device) with (beacon adj signal adj detectable) with (baseband adj subsystem) with (mobile adj device) with (communication adj range) with (respective adj beacon) with (encoding adj desired adj information) with (naming adj packet) with (beacon adj signal) with (authorize adj wireless adj scanning adj device) with (telematics) with (location adj base adj services adj application) with (LBS)).clm.	US-PGPUB; USPAT	OR	OFF	2017/07/10 14:11
L6	0	mendelson.in. and ((beacon) with (conveying adj desired adj information) with (radio adj frequency adj beacon) with (vehicle) with (RF adj beacon) with (communication adj device) with (beacon adj signal adj detectable) with (baseband adj subsystem) with (mobile adj device) with (communication adj range) with (respective adj beacon) with (encoding adj desired adj information) with (naming adj packet) with (beacon adj signal) with (authorize adj wireless adj scanning adj device) with (telematics) with (location adj base adj services adj application) with (LBS)).clm.	US-PGPUB; USPAT	OR	OFF	2017/07/10 14:11
L9	0	mendelson.in. and ((beacon) with (conveying adj desired adj information) with (radio adj frequency adj beacon) with (vehicle) with (RF adj beacon) with (communication adj device) with (beacon adj signal adj detectable) with (baseband adj subsystem) with (mobile adj device) with (communication adj range) with (respective adj beacon) with (encoding adj desired adj information) with (naming adj packet) with (beacon adj signal) with (authorize	US-PGPUB; USPAT	OR	OFF	2017/07/10 14:12

		adj wireless adj scanning adj device) with (telematics) with (location adj base adj services adj application) with (LBS))				
S1	18	(beacon and (geographic adj location) and encoding and broadcasting and scanning and decoding and (location adj based adj service))	US-PGPUB; USPAT	OR	ON	2017/03/06 00:40
S2	16	(beacon and (geographic adj location) and encoding and broadcasting and scanning and decoding and (location adj based adj service) and (mobile adj device))	US-PGPUB; USPAT	OR	ON	2017/03/06 00:40
S3	16	((beacon adj signal) and (geographic adj location) and encoding and broadcasting and scanning and decoding and (location adj based adj service) and (mobile adj device))	US-PGPUB; USPAT	OR	ON	2017/03/06 00:40
S4	0	((beacon adj signal) and (geographic adj location) and encoding and broadcasting and scanning and decoding and (location adj based adj service) and (mobile adj device) and (identification adj segment))	US-PGPUB; USPAT	OR	ON	2017/03/06 00:41
S5	15	((beacon adj signal) and (geographic adj location) and encoding and broadcasting and scanning and decoding and (location adj based adj service) and (mobile adj device) and (identification) and LBS)	US-PGPUB; USPAT	OR	ON	2017/03/06 00:41
S6	0	(beacon with deploying with (localized adj geographic adj area) with (associated adj known adj geographic adj location) with (encoding) with (identification adj segment) with (beacon adj signal) with (encoded adj address) with (broadcasting) with (scanning) with (mobile adj device) with (receiver adj circuit) with (decoding) with (activating) with (location adj based adj service) with LBS)	US-PGPUB; USPAT	OR	ON	2017/03/06 00:51
S7	0	(beacon with deploying with (localized adj geographic adj area) with (associated adj known adj geographic adj location) with (encoding) with (identification adj segment) with (beacon adj signal) with (encoded adj address) with (broadcasting) with (scanning) with (mobile adj device) with (receiver adj circuit) with (decoding) with (activating) with (location adj based adj service) with LBS).clm.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:51
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S9	0	mendelson.in. and (beacon with deploying with (localized adj geographic adj area) with (associated adj known adj geographic adj location) with (encoding) with (identification adj segment) with (beacon adj signal) with (encoded adj address) with (broadcasting) with (scanning) with (mobile adj device) with (receiver adj circuit) with (decoding) with (activating) with (location adj based adj	US-PGPUB; USPAT	OR	ON	2017/03/06 00:52

		service) with LBS)				
S10	0	S1 and 455/41.2.ccls.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:58
S11	11	S1 and H04W4/22.cpc.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:58
S12	1	S1 and H04W4/008.cpc.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:59
S13	1	S1 and H04W4/021.cpc.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:59
S14	1	S1 and H04W4/023.cpc.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:59
S15	1	S1 and H04W40/244.cpc.	US-PGPUB; USPAT	OR	ON	2017/03/06 00:59
S16	18	"8896485"	US-PGPUB; USPAT	OR	ON	2017/03/06 00:59
S17	10	"8770477"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00
S18	16	"8705527"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00
S19	3	"20120023171"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00
S20	2	"20120084364"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00
S21	2	"20120188101"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00
S22	1	"20130113936"	US-PGPUB; USPAT	OR	ON	2017/03/06 01:00

7/ 10/ 2017 2:28:53 PM
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<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 15403146	Applicant(s)/Patent Under Reexamination MENDELSON, EHUD
	Examiner APRIL G GONZALES	Art Unit 2648

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	07/10/2017								
	1	=								
	2	=								
	3	=								
	4	=								
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	20	=								
	21	=								

Search Notes 	Application/Control No. 15403146	Applicant(s)/Patent Under Reexamination MENDELSON, EHUD
	Examiner APRIL G GONZALES	Art Unit 2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W4/008, H04W4/021	7/10/2017	AGG
H04W48/10	7/10/2017	AGG
H04W76/007	7/10/2017	AGG

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	41.2	7/10/2017	AGG

SEARCH NOTES		
Search Notes	Date	Examiner
H04W76/007	7/10/2017	AGG
H04W4/008, H04W4/021	7/10/2017	AGG
H04W48/10	7/10/2017	AGG
EAST image and keyword search	7/10/2017	AGG
CPC search	7/10/2017	AGG
Double Patenting Search	7/10/2017	AGG
Interference Search	7/10/2017	AGG
IDS filed on 01/10/2017	7/10/2017	AGG

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	EAST keyword claim search	7/10/2017	AGG

	/APRIL G GONZALES/ Primary Examiner.Art Unit 2648
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Issue Classification 	Application/Control No. 15403146	Applicant(s)/Patent Under Reexamination MENDELSON, EHUD	
	Examiner APRIL G GONZALES	Art Unit 2648	

CPC						
Symbol					Type	Version
G01C		21	/	206	F	2013-01-01
H04W		48	/	10	I	2013-01-01
H04W		4	/	008	I	2013-01-01
H04W		4	/	021	I	2013-01-01
G01S		19	/	46	I	2013-01-01
G01S		1	/	04	I	2013-01-01
B60R		25	/	20	I	2013-01-01
G06Q		20	/	102	I	2013-01-01
H04W		76	/	007	I	2013-01-01
B60R		2325	/	205	A	2013-01-01
B60R		2325	/	101	A	2013-01-01
B60R		2325	/	103	A	2013-01-01
G06Q		2240	/	00	A	2013-01-01
			/			
			/			

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
(Assistant Examiner)		21	
(Date)			
/APRIL G GONZALES/	07/10/2017	O.G. Print Claim(s)	O.G. Print Figure
Primary Examiner.Art Unit 2648		1	1
(Primary Examiner)	(Date)		

Issue Classification 	Application/Control No. 15403146	Applicant(s)/Patent Under Reexamination MENDELSON, EHUD
	Examiner APRIL G GONZALES	Art Unit 2648

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17												
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	14														
	15														
	16														

NONE	Total Claims Allowed: 21	
(Assistant Examiner)	(Date)	
/APRIL G GONZALES/ Primary Examiner.Art Unit 2648	07/10/2017	O.G. Print Claim(s) 1
(Primary Examiner)	(Date)	O.G. Print Figure 1



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

BIB DATA SHEET

CONFIRMATION NO. 4885

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/403,146	01/10/2017	455	2648	MEN-17-002
APPLICANTS INVENTORS Ehud MENDELSON, Coral Springs, FL; ** CONTINUING DATA ***** This application is a DIV of 15/397,685 01/03/2017 PAT 9674684 which is a DIV of 15/237,727 08/16/2016 PAT 9538332 which is a DIV of 15/086,028 03/30/2016 PAT 9420423 which is a DIV of 14/285,406 05/22/2014 PAT 9602193 which is a DIV of 14/285,332 05/22/2014 PAT 9491584 which is a DIV of 14/285,273 05/22/2014 PAT 9204257 which is a DIV of 14/285,209 05/22/2014 PAT 9204251 which is a DIV of 12/930,735 01/14/2011 PAT 9020687 which is a DIV of 11/396,843 04/03/2006 PAT 7899583 which claims benefit of 60/670,097 04/12/2005 This application 15/403,146 01/10/2017 is a DIV of 15/397,685 01/03/2017 PAT 9674684 which is a DIV of 15/237,727 08/16/2016 PAT 9538332 which is a DIV of 15/086,028 03/30/2016 PAT 9420423 which is a DIV of 14/285,406 05/22/2014 PAT 9602193 which is a DIV of 14/285,332 05/22/2014 PAT 9491584 which is a DIV of 14/285,273 05/22/2014 PAT 9204257 which is a DIV of 14/285,209 05/22/2014 PAT 9204251 which is a DIV of 13/135,421 07/05/2011 PAT 9374673 which is a DIV of 12/932,811 03/07/2011 PAT 8941485 which is a DIV of 12/069,899 02/13/2008 PAT 7924149 which is a DIV of 11/472,706 06/22/2006 PAT 8896485 which is a DIV of 11/429,864 05/08/2006 PAT 8836580 which claims benefit of 60/678,947 05/09/2005 This application 15/403,146 01/10/2017 is a DIV of 15/397,685 01/03/2017 PAT 9674684 which is a DIV of 15/237,727 08/16/2016 PAT 9538332 which is a DIV of 15/086,028 03/30/2016 PAT 9420423 which is a DIV of 14/285,406 05/22/2014 PAT 9602193 which is a DIV of 14/285,332 05/22/2014 PAT 9491584 which is a DIV of 14/285,273 05/22/2014 PAT 9204257 which is a DIV of 14/285,209 05/22/2014 PAT 9204251 which is a DIV of 12/587,042 10/01/2009 PAT 8866673 which is a DIV of 11/429,864 05/08/2006 PAT 8836580 which claims benefit of 60/678,947 05/09/2005 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 02/14/2017				



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/403,146	01/10/2017		970	MEN-17-002	21	2

CONFIRMATION NO. 4885

FILING RECEIPT



CC000000089233951

31877
ALLEN D. HERTZ
ALLEN D HERTZ, P.A.
12784 TULIPWOOD CIRCLE
BOCA RATON, FL 33428

Date Mailed: 02/15/2017

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**

Inventor(s)

Ehud MENDELSON, Coral Springs, FL;

Applicant(s)

Ehud MENDELSON, Coral Springs, FL;

Power of Attorney: The patent practitioners associated with Customer Number 31877

Domestic Priority data as claimed by applicant

This application is a DIV of 15/397,685 01/03/2017
which is a DIV of 15/237,727 08/16/2016 PAT 9538332
which is a DIV of 15/086,028 03/30/2016 PAT 9420423
which is a DIV of 14/285,406 05/22/2014
which is a DIV of 14/285,332 05/22/2014 PAT 9491584
which is a DIV of 14/285,273 05/22/2014 PAT 9204257
which is a DIV of 14/285,209 05/22/2014 PAT 9204251
which is a DIV of 12/930,735 01/14/2011 PAT 9020687
which is a DIV of 11/396,843 04/03/2006 PAT 7899583
which claims benefit of 60/670,097 04/12/2005

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which is a DIV of 14/285,273 05/22/2014 PAT 9204257
which is a DIV of 14/285,209 05/22/2014 PAT 9204251
which is a DIV of 13/135,421 07/05/2011 PAT 9374673

which is a DIV of 12/932,811 03/07/2011 PAT 8941485
which is a DIV of 12/069,899 02/13/2008 PAT 7924149
which is a DIV of 11/472,706 06/22/2006 PAT 8896485
which is a DIV of 11/429,864 05/08/2006 PAT 8836580
which claims benefit of 60/678,947 05/09/2005
This application 15/403,146
is a DIV of 15/397,685 01/03/2017
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which is a DIV of 14/285,406 05/22/2014
which is a DIV of 14/285,332 05/22/2014 PAT 9491584
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which is a DIV of 12/587,042 10/01/2009 PAT 8866673
which is a DIV of 11/429,864 05/08/2006 PAT 8836580
which claims benefit of 60/678,947 05/09/2005

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 02/14/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/403,146**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

**** SMALL ENTITY ****

Title

VEHICLE BEACON AND METHOD OF USE

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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 (1-866-999-4258).

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).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/403,146				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A				
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A				
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	21	minus 20 = *	1	x 40 =	40					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *		x 210 =	0.00					
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).				200					
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					0.00					
			TOTAL		970	TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=		x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		x	=
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			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.										

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT4269141

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
	Name	Execution Date
	MR EHUD MENDELSON	02/01/2017
RECEIVING PARTY DATA		
Name:	GAMBA GROUP LIMITED	
Street Address:	265 TRIQ SAN ALBER	
City:	GZIRA	
State/Country:	MALTA	
Postal Code:	GZR 1155	
PROPERTY NUMBERS Total: 1		
	Property Type	Number
	Application Number:	15403146
CORRESPONDENCE DATA		
Fax Number:	(561)883-0115	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>		
Phone:	561-716-3915	
Email:	Patents@AllenHertz.com	
Correspondent Name:	ALLEN D. HERTZ P.A.	
Address Line 1:	12784 TULIPWOOD CIRCLE	
Address Line 4:	BOCA RATON, FLORIDA 33428	
ATTORNEY DOCKET NUMBER:	MEN-17-002	
NAME OF SUBMITTER:	ALLEN D HERTZ	
SIGNATURE:	/Allen D Hertz/	
DATE SIGNED:	02/10/2017	
	This document serves as an Oath/Declaration (37 CFR 1.63).	
Total Attachments: 3		
source=MEN-17-001_Mendelson_Home_Beacon_Assignment-Executed#page1.tif		
source=MEN-17-001_Mendelson_Home_Beacon_Assignment-Executed#page2.tif		
source=MEN-17-001_Mendelson_Home_Beacon_Assignment-Executed#page3.tif		

ASSIGNMENT

WHEREAS, I:

(4) **Ehud Mendelson**,

residing, respectively, at:

(4) **11190 Heron Bay Blvd. Suite 916, Coral Springs, FL,**

33076,

have made an invention entitled: **BEACON DEPLOYMENT FOR USE
WITH LOCATION BASED SERVICES
(LBS)**

and [] are about to make application for United States Letters Patent therefor, the same being executed by us on _____, 2017; and

[X] have made application for United States Letters Patent thereof, filed **January 03, 2017**, under **Serial No. 15/397,685**, currently pending; and

WHEREAS, **Gamba Group Limited**, a For Profit Corporation organized and existing under the laws of the state of **Malta** and having an office and place of business at **265 Triq San Alber, Gzira, Malta, GZR 1155**, is desirous of acquiring the entire interest in said invention, said United States patent application, and in any Letters Patent which may issue thereon;

NOW, THEREFORE, be it known that for and in consideration of my employment Gamba Group Limited, and other good and valuable consideration, I do hereby sell, assign, and transfer unto Gamba Group Limited, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention and any improvements thereon for all countries of the world, and in and to said application, including any continuations and divisions thereof, and any substitute applications therefor, and any patent which may issue thereon, and any reissues of the same; and all right, title, and interest in and to every patent application filed on said invention in any other country, including renewals, revivals, continuations, and divisions thereof, and any substitute applications therefor, and any and all patents which may issue thereon, and any reissues and extensions of the same; and we hereby authorize and request competent authorities to grant and issue any and all patents on said invention to Gamba Group Limited as the assignee of the entire interest therein; and we further agree to execute upon request of the assignee such additional documents, if any, as are necessary and proper to secure patent protection on said invention throughout all countries of the world, and otherwise to give full effect to and perfect the rights of the assignee under this Assignment.

IN TESTIMONY WHEREOF, I have hereunto signed my name on
the dates indicated hereinafter:

2/1/17
Date

Ehud Mendelson
Ehud Mendelson

STATE OF Florida)
COUNTY OF Broward) ss.:

Before me a Notary Public for Said County, personally
appeared Ehud Mendelson, to me known and
known to me to be the person who executed the foregoing
instrument and acknowledged it to be a free act and deed.

Witness my hand and seal Feb, 1, 2017.

[Notary Seal]

[Signature]
Notary Public

My Commission expires:

Nov. 1, 2019

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.

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(h))</i>		Attorney Docket No. MEN-17-002	
		First Named Inventor Ehud Mendelson	
		Title VEHICLE BEACON AND METHOD OF USE	
		Express Mail Label No. Filed via EFSweb	

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☒ Applicant asserts small entity status. See 37 CFR 1.27. 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages <u>125</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) [35 U.S.C. 113] [Total Sheets <u>13</u>] 6. Inventor's Oath or Declaration [Total Pages <u>1</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/34 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program [Appendix] ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee) 12. ☐ English Translation Document (if applicable) 13. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☒ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☒ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☐ Other: _____ _____ _____ _____

*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS				
☒ The address associated with Customer Number: <u>31877</u> OR ☐ Correspondence address below.				
Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		
Signature			Date	January 10, 2017
Name (Print/Type)	Allen D. Hertz		Registration No. (Attorney/Agent)	50,942

This collection of information is required by 37 CFR 1.53(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.

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

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	VEHICLE BEACON AND METHOD OF USE
--------------------	----------------------------------

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or ☐ United States application or PCT international application number _____ filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

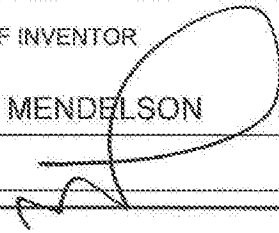
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Ehud MENDELSON Date (Optional): January 10, 2017

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		
<p>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.</p> <p>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.</p>			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor 1 Remove				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mr.	Ehud		Mendelson	
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service				
City	Coral Springs	State/Province	FL	Country of Residence US
Mailing Address of Inventor:				
Address 1		11190 Heron Bay Blvd		
Address 2				
City	Coral Springs	State/Province	FL	
Postal Code	33076	Country	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	31877		
Email Address	Patents@AllenHertz.com	Add Email	Remove Email

Application Information:

Title of the Invention			
Attorney Docket Number	MEN-17-002	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	13	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☒ **Request Not to Publish.** 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 **has not and will not** 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). Either enter 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.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	31877		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim 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.

When referring to the current application, please leave the "Application Number" field blank.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
BRANCH A					
Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Division of	15397685	2017-01-03		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15397685	Division of	15237727	2016-08-16	9538332	2017-01-03
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15237727	Division of	15086028	2016-03-30	9420423	2016-08-16
Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15086028	Division of	14285406	2014-05-22		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285406	Division of	14285332	2014-05-22	9491584	2016-11-08
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285332	Division of	14285273	2014-05-22	9204257	2015-12-01
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285273	Division of	14285209	2014-05-22	9204251	2015-12-01
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285209	Division of	12930735	2011-01-14	9020687	2015-04-28
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12930735	Division of	11396843	2006-04-03	7899583	2011-03-01

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Prior Application Status	Expired		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
11396843	Claims benefit of provisional	60670097	2005-04-12		
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
BRANCH B					
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Division of	15397685	2017-01-03		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15397685	Division of	15237727	2016-08-16	9538332	2017-01-03
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15237727	Division of	15086028	2016-03-30	9420423	2016-08-16
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15086028	Division of	14285406	2014-05-22		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285406	Division of	14285332	2014-05-22	9491584	2016-11-08
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285332	Division of	14285273	2014-05-22	9204257	2015-12-01
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285273	Division of	14285209	2014-05-22	9204251	2015-12-01

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285209	Division of	13135421	2011-07-05	9374673	2016-06-21
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13135421	Division of	13932811	2011-03-07	8941485	2015-01-27
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13932811	Division of	12069899	2008-02-13	7924149	2011-04-12
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12069899	Division of	11472706	2006-06-22	8896485	2014-11-25
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
11472706	Division of	11429864	2006-05-08	8836580	2014-09-16
Prior Application Status		Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
11429864	Claims benefit of provisional	60678947	2005-05-09		
Prior Application Status		Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
		Division of	15397685	2017-01-03	
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15397685	Division of	15237727	2016-08-16	9538332	2017-01-03
Prior Application Status		Patented			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15237727	Division of	15086028	2016-03-30	9420423	2016-08-16

BRANCH C

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15086028	Division of	14285406	2014-05-22		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285406	Division of	14285332	2014-05-22	9491584	2016-11-08
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285332	Division of	14285273	2014-05-22	9204257	2015-12-01
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285273	Division of	14285209	2014-05-22	9204251	2015-12-01
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14285209	Division of	12587042	2009-10-01	8866876	2014-10-21
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12587042	Division of	11429864	2006-05-08	8836580	2014-09-16
Prior Application Status	Expired		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
11429864	Claims benefit of provisional	60678947	2005-05-09		

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. 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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(i)(1).

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	 Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p>☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p>
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.		
Applicant 1		
<p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>		
<input type="button" value="Clear"/>		
☐ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor
☐ Person to whom the inventor is obligated to assign.	☐ Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor: <input type="text"/>		
If the Applicant is an Organization check here. ☐		

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Applicant:				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country ¹		Postal Code	
Phone Number		Fax Number	
Email Address			

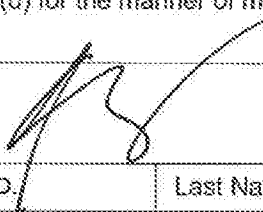
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature			Date (YYYY-MM-DD)	2017-01-10	
First Name	Allen D.	Last Name	Hertz	Registration Number	50942

Additional Signature may be generated within this form by selecting the Add button.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MEN-17-002
		Application Number	
Title of Invention	VEHICLE BEACON AND METHOD OF USE		

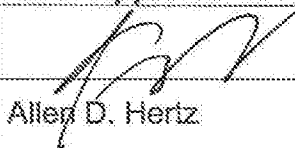
This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes 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 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.**

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Title	VEHICLE BEACON AND METHOD OF USE
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

SIGNATURE of Applicant or Patent Practitioner

Signature		Date (Optional)	January 10, 2017
Name	Allen D. Hertz	Registration Number	50,942
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

31877

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

January 10, 2017

Name

Ehud MENDELSON

Title

Inventor

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 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.

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Sheet 1 of 5

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Application Number	[Not Yet Assigned]
Filing Date	January 10, 2017
First Named Inventor	Ehud MENDELSON
Art Unit	[Not Yet Assigned]
Examiner Name	[Not Yet Assigned]
Attorney Docket Number	MEN-17-002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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Attorney Docket Number	MEN-17-002

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Sheet 5 of 5

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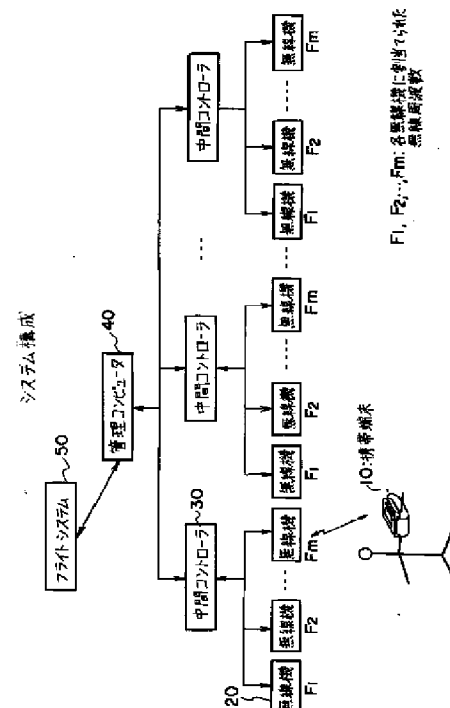
(74)代理人 弁理士 吉田 研二 (外2名)

(54)【発明の名称】 ルート案内システム

(57)【要約】

【課題】 空港ビル内等で利用者を案内する。

【解決手段】 各無線機20の電波範囲にて空港ビル内の必要な領域を網羅できるように空港ビル内に複数の無線機20を分散配置し、電波範囲が重複する無線機20同士が同じ無線周波数とならないよう各無線機20に無線周波数F1～Fmを割り当てる。旅客等の利用者により携帯される携帯端末10は、各無線機20から送信されるその位置を示す無線機IDを受信し、受信した無線機IDに基づき自分の現在地を求め、さらに目的地に至るルートを求め、階間移動装置に留意して表示する。管理コンピュータ40は、無線機20を介し携帯端末10から現在地情報を収集し、フライト情報及び旅客情報に基づき個別の携帯端末10に対しメッセージ送信や呼出しを行う。



【特許請求の範囲】

【請求項1】 携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、複数の階を有する建物の屋内空間に分散配置された複数の無線機と、上記屋内空間を移動する利用者により携帯される上記携帯端末と、を有し、

上記無線機が、その位置を示す無線機位置情報を無線送信する手段を備え、

上記携帯端末が、上記無線機位置情報を無線受信する手段と、当該無線機位置情報に基づき当該携帯端末の現在地を示す現在地情報を生成する手段と、当該現在地情報、目的地を示す目的地情報及び上記建物の屋内地図を示す地図情報に基づき、現在地から目的地に至るルートを示すルート情報を生成する手段と、上記ルートの各階部分が含まれる各階地図を、上記ルート情報に基づき、かつ、同一階間移動装置の行方向又は列方向の位置が揃うよう単一画面上に並べて、可視表示する手段と、を備え、

複数階に亘る屋内空間にて上記携帯端末の利用者を目的地まで案内することを特徴とするルート案内システム。

【請求項2】 請求項1記載のルート案内システムにおいて、

上記携帯端末が、目的地の候補の分類を可視表示する手段と、利用者により操作される可操作部材と、利用者が可操作部材の操作によりいずれかの分類を選択した場合にその分類をさらに細かく分類して可視表示させる手段と、利用者が可操作部材の操作により入力終了を指示した場合にそれまでに選択された階層的な分類に従い目的地を決定する手段と、を備えることを特徴とするルート案内システム。

【請求項3】 請求項1又は2記載のルート案内システムにおいて、

上記無線機が、上記携帯端末の利用者の呼出し先を示す呼出し先情報及び／又は当該利用者に伝達すべきメッセージを示すメッセージ情報を無線送信する手段を備え、上記携帯端末が、上記無線機から上記呼出し先情報及び／又はメッセージ情報を無線受信する手段と、上記呼出し先情報を上記目的地情報として扱う手段と、上記メッセージ情報に基づき上記メッセージを上記ルートと共に又は当該ルートに代えて可視表示する手段と、を備えることを特徴とするルート案内システム。

【請求項4】 請求項1乃至3記載のルート案内システムにおいて、

上記携帯端末が、相異なる階に配置されている複数の無線機からそれぞれ無線機位置情報を無線受信した場合に、当該無線機位置情報を無線送信した無線機の各階毎個数を判定し、当該個数が他の階に比べ少ない階に配置されている無線機からの無線機位置情報を、上記現在地情報の生成に使用することを禁止する手段を備えることを特徴とするルート案内システム。

【請求項5】 請求項1乃至4記載のルート案内システムにおいて、

上記携帯端末が、上記建物内に設けられているトイレ、レストラン、階間移動装置等の設備の位置を示す情報を、外部記憶媒体から上記地図情報として読み出す手段を備えることを特徴とするルート案内システム。

【請求項6】 請求項1乃至5記載のルート案内システムにおいて、

上記携帯端末が、その携帯端末の現在地がルートから所定程度以上外れた場合に、ルートから外れた旨を当該携帯端末の利用者に報知する手段を備えることを特徴とするルート案内システム。

【請求項7】 請求項1乃至6記載のルート案内システムにおいて、

上記携帯端末が、その携帯端末の現在地がルートから所定程度以上外れた場合に、その時点での現在地から目的地に至るルートを示すルート情報を生成する手段を備えることを特徴とするルート案内システム。

【請求項8】 請求項1乃至7記載のルート案内システムにおいて、

上記携帯端末が、上記ルートの全体が単一画面上に表示されかつ当該ルートが最大表示されるよう、その現在地の変化に応じ表示倍率を変化させる手段を備えることを特徴とするルート案内システム。

【請求項9】 請求項8記載のルート案内システムにおいて、

上記携帯端末が、ルート及びその周辺のエリアを示す地図を表示するのみでは画面上の表示可能領域に対する実表示領域の不足が生じる場合に、隣接するエリアの地図にて表示を補填する手段と、補填の際、既に踏破されたルートの少なくとも一部を含むエリアの地図を優先的に使用する手段と、を備えることを特徴とするルート案内システム。

【請求項10】 請求項1乃至9記載のルート案内システムにおいて、

上記携帯端末が、上記現在地情報を無線送信する手段を備え、

上記無線機が、上記現在地情報を無線受信する手段を備え、

上記ルート案内システムが、上記無線機により無線受信された上記現在地情報を収集することにより上記利用者の動向を管理する手段を有することを特徴とするルート案内システム。

【請求項11】 請求項10記載のルート案内システムにおいて、

上記無線機が、上記携帯端末からの返答を求める返答要求信号を、必要に応じ無線送信する手段を備え、

上記携帯端末が、上記返答要求信号を無線受信する手段と、当該返答要求信号に応じ上記現在地情報の無線送信を実行させる手段と、を備えることを特徴とするルート

案内システム。

【請求項12】 請求項1乃至11記載のルート案内システムにおいて、
上記携帯端末が、その携帯端末の利用者の身体に当該携帯端末を着脱可能に固定するベルトを備えることを特徴とするルート案内システム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、空港、大規模店舗、大規模公共施設等の屋内において利用者に対し進むべきルートに関する情報を提供するルート案内システムに関する。

【0002】

【従来技術】自位置等を示す位置情報を屋外の利用者に提供するシステムとしては、例えば、速度センサ及び方位センサを用いて自位置を求める推測航法や、インフラストラクチャから受信した情報に基づき自位置を求めるGPS (Global Positioning System) 等のシステムや、間隔配置されたビーコン局から識別符号を無線受信しこれを目的地に係る識別符号と比較することにより目的地への到来を検出するビーコンシステム (特開平6-52487号参照) が知られている。また、これらのシステムと、CD-ROM等により提供される地図データベースとを組み合わせることにより、現在地から目的地に至るルートを示すルート情報を利用者に提供することができる。例えば、GPS等から得られる自位置、利用者から与えられる目的地、及びCD-ROM等に格納されている地図を用いてルート情報を生成し、可視表示する車載ナビゲーションシステムが既に普及している。

【0003】

【発明が解決しようとする課題】しかし、このシステムは、屋内にいる者に対しルート情報を提供するには適していない。第1に、人工衛星 (GPS衛星) 等のように屋外にあるインフラストラクチャからの信号は、屋根や壁により遮蔽される結果屋内では受信できないから、GPS等のシステムを屋内で利用することは原理上不可能である。

【0004】第2に、特開平6-52487号に記載されているビーコンシステムは、単一の無線周波数を複数のビーコン局にて共用するシステムであるから、利用者がビーコン信号を受信した場合にその信号をどのビーコン局から受信したか確実に特定できるようにするためには、ビーコン局の間隔を疎にする (例えば無線通信可能範囲が互いに重複しないよう、かつ周辺環境の影響も考慮しながら、相隣接するビーコン局の位置を広めに定める) 必要がある。このようなビーコン局配置では利用者がビーコン信号を受信できない空白エリアが必ず発生するため、高々目的地又は経由地への到来・接近を検出できるに過ぎず、現在地から目的地に至るルートを利用者に知らしめることはできない。

【0005】第3に、特開平6-52487号に記載されているビーコンシステムを周知のセルラシステムを参考にして変形し、相異なる無線周波数を相隣接するビーコン局に割り当てかつ相隣接するビーコン局の無線通信可能範囲を重複させれば、上述の空白エリアの問題を解消できる。しかし、そのような変形を施すのみでは、単一平面上におけるルート情報を生成できるようになるに過ぎないから、一般に複数の階を有する建物の中で利用者を効率的かつ確実に目的地まで案内することはできない。

【0006】本発明の第1の目的は、無線通信技術を利用することにより、屋内にいる者に対しルート情報を提供可能にすることにある。本発明の第2の目的は、利用者に対し無線信号を送信する無線機の間隔を密にしかつ電波範囲が重複する無線機に互いに異なる無線周波数を割り当てることにより、いずれの無線機からも無線信号を受信できない空白エリアをなくし利用者が常にルート情報の提供を受けられるようにすると共に、無線信号同士の衝突を防止することにある。本発明の第3の目的は、ルート表示方法を工夫することにより、利用者がルートを直観的に把握できるようにし、さらには複数の階を有する建物の中でも利用者を効率的かつ確実に目的地まで案内できるようにすることにある。

【0007】本発明の第4の目的は、目的地の階層の入力を可能にすることにより、できるだけ少ない入力操作にて目的地を設定可能にし、利用者を行きたいところへ迅速に案内できるようにすることにある。本発明の第5の目的は、無線通信を利用することにより、必要に応じ利用者を所定又は特定の場所へ呼び出すことを可能にすることにある。本発明の第6の目的は、受信した無線信号の送信元の所属階に着目することにより、利用者が階段脇に立ち止まったときや通り過ぎたとき等においても間違いなく利用者を案内できるようにすることにある。本発明の第7の目的は、利用者が頻繁に利用するであろう設備又は利用者が利用する確率の高い設備に関する情報をデータベース化することにより、できるだけ少ない情報量の地図情報を用いて上述の各目的を達成可能にし、ひいては利用者が携帯する装置を小型簡素にすることにある。本発明の第8の目的は、案内されたルートを利用者が見失った場合に自力又は他力でリカバリする機会をその利用者に与えることにより、利用者を目的地まで確実にかつ迅速に案内可能にすることにある。本発明の第9の目的は、ルートの表示方法を工夫することにより、現在地の変化によらず常に見易い形で利用者にルート情報を提供可能にし、以て使用性の高い装置を実現することにある。本発明の第10の目的は、無線通信を利用することにより、利用者の動向を常に又は定期的に把握可能にすることにある。本発明の第11の目的は、装置構造の工夫により、利用者が携帯しやすい装置を実現することにある。

【0008】

【課題を解決するための手段】このような目的を達成するために、本発明の第1の構成に係るルート案内システムは、携帯端末との無線機の無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、複数の階を有する建物の屋内空間に分散配置された複数の無線機と、上記屋内空間を移動する利用者により携帯される上記携帯端末と、を有し、上記無線機が、その位置を示す無線機位置情報を無線送信する手段を備え、上記携帯端末が、上記無線機位置情報を無線受信する手段と、当該無線機位置情報に基づき当該携帯端末の現在地を示す現在地情報を生成する手段と、当該現在地情報、目的地を示す目的地情報及び上記建物の屋内地図を示す地図情報に基づき、現在地から目的地に至るルートを示すルート情報を生成する手段と、上記ルートの各階部分が含まれる各階地図を、上記ルート情報に基づき、かつ、同一階間移動装置の行方向又は列方向の位置が揃うよう単一画面上に並べて、可視表示する手段と、を備え、複数階に亘る屋内空間にて上記携帯端末の利用者を目的地まで案内することを特徴とする。

【0009】本構成においては、建物の屋内空間に分散配置された無線機を利用している。各無線機は、携帯端末との無線通信可能範囲が互いに重複するよう配置され、また各無線機には、携帯端末との無線通信可能範囲が互いに重複する無線機が同じ無線周波数を使用することがないように、無線周波数が割り当てられている。従って、各携帯端末は常にいずれかの無線機から無線機位置情報を受信でき、従来のビーコンシステムで生じていたような空白エリアは生じないから、屋内空間を移動する利用者が常にルート情報を受け取ることができる。その際、無線機からの無線信号が衝突することもない。さらに、受信した無線機位置情報に基づきルート情報を生成する際、その携帯端末が複数の無線機と無線通信可能な位置にあれば、当該複数の無線機からの無線機位置情報をいずれも利用できるから、現在地情報の精度・分解能は高く、従ってルート情報もより正確になる。本構成においては、さらに、ルート情報に基づきルートを可視表示する際、ルートの各階部分が含まれる各階地図が単一画面上に並べて可視表示される。従って、利用者は複数階にまたがるルートを常に一覽できる。同時に、各階地図を並べて可視表示する際、同一の階間移動装置（例えばエレベータ、エスカレータ、階段等）の行方向又は列方向の位置が揃うよう各階位置を位置決めしているから、利用者は表示画面から直観的に現在地、目的地、ルート等の相互関係を見て取ることができる。このように、本構成においては、複数の階を有する建物における利用者の案内が、効率化及び確実化される。

【0010】本発明の第2の構成に係るルート案内システムは、第1の構成において、上記携帯端末が、目的地の候補の分類を可視表示する手段と、利用者により操作

される可操作部材と、利用者が可操作部材の操作によりいずれかの分類を選択した場合にその分類をさらに細かく分類して可視表示させる手段と、利用者が可操作部材の操作により入力終了を指示した場合にそれまでに選択された階層的な分類に従い目的地を決定する手段と、を備えることを特徴とする。本構成においては、目的地の階層的入力を可能にしているため、最少の入力操作にて目的地を設定でき、利用者を行きたいところへ迅速に案内可能になる。

10 【0011】本発明の第3の構成に係るルート案内システムは、第1又は第2の構成において、上記無線機が、上記携帯端末の利用者の呼出し先を示す呼出し先情報及び／又は当該利用者に伝達すべきメッセージを示すメッセージ情報を無線送信する手段を備え、上記携帯端末が、上記無線機から上記呼出し先情報及び／又はメッセージ情報を無線受信する手段と、上記呼出し先情報を上記目的地情報として扱う手段と、上記メッセージ情報に基づき上記メッセージを上記ルートと共に又は当該ルートに代えて可視表示する手段と、を備えることを特徴とする。本構成においては、呼出し先情報の無線送信にて各携帯端末に目的地を設定したメッセージを送信しているため、必要に応じ利用者を所定の又は特定の場所へ呼び出またメッセージを伝達することが可能になる。

20 【0012】本発明の第4の構成に係るルート案内システムは、第1乃至第3の構成において、上記携帯端末が、相異なる階に配置されている複数の無線機からそれぞれ無線機位置情報を無線受信した場合に、当該無線機位置情報を無線送信した無線機の各階毎個数を判定し、当該個数が他の階に比べ少ない階に配置されている無線機からの無線機位置情報を、上記現在地情報の生成に使用することを禁止する手段を備えることを特徴とする。本構成においては、各階毎に受信無線信号の多寡を判定し多数階からの無線機位置情報を現在地決定に利用しているため、例えば、利用者が階段脇に立ち止まったときや通り過ぎたとき等のように複数の階から同時に無線機位置情報を受信できるような状況でも、間違いなく利用者が案内される。

30 【0013】本発明の第5の構成に係るルート案内システムは、第1乃至第4の構成において、上記携帯端末が、上記建物内に設けられているトイレ、レストラン、階間移動装置等の設備の位置を示す情報を、外部記憶媒体から上記地図情報として読み出す手段を備えることを特徴とする。本構成においては、利用者が頻繁に利用するであろう設備又は利用者が利用する確率の高い設備に関する情報が外部記憶媒体上にデータベース化されているため、地図情報の情報量が少なく済み、従って携帯端末が小型簡素になる。

40 【0014】本発明の第6の構成に係るルート案内システムは、第1乃至第5の構成において、上記携帯端末が、その携帯端末の現在地がルートから所定程度以上外

れた場合に、ルートから外れた旨を当該携帯端末の利用者に報知する手段を備えることを特徴とする。本発明の第7の構成に係るルート案内システムは、第1乃至第6の構成において、上記携帯端末が、その携帯端末の現在地がルートから所定程度以上外れた場合に、上記現在地情報、目的地情報及び地図情報に基づき、ルート情報を再度生成する手段を備えることを特徴とする。これらの構成においては、案内されたルートを利用者が見失った場合に、ルート外れ報知(第6の構成)又は再案内(第7の構成)によりリカバリの機会が利用者に与えられるから、利用者が目的地までより確実かつ迅速に案内される。さらに、携帯端末の現在地がルートから所定程度以上外れたか否かの判定は、その時点で無線機から受信できる無線周波数や無線機位置情報が予測から外れたか否かの判定として実現できるから、上記ルート外れ判定により格別の負荷が発生することもない。

【0015】本発明の第8の構成に係るルート案内システムは、第1乃至第7の構成において、上記携帯端末が、上記ルートの全体が単一画面上に表示されかつ当該ルートが最大表示されるよう、その現在地の変化に応じ表示倍率を変化させる手段を備えることを特徴とする。本発明の第9の構成に係るルート案内システムは、第8の構成において、上記携帯端末が、ルート及びその周辺のエリアを示す地図を表示するのみでは画面上の表示可能領域に対する実表示領域の不足が生じる場合に、隣接するエリアの地図にて表示を補填する手段と、補填の際、既に踏破されたルートの少なくとも一部を含むエリアの地図を優先的に使用する手段と、を備えることを特徴とする。これらの構成においては、利用者の移動に伴いルート表示が適宜変化(通常は拡大)していくから、現在地の変化によらず常に見易いルート表示が実現され、これにより使用性が高まる。特に、第9の構成においては、ルートが属するエリアのみでは画面を満たせない場合に既に踏破されたルートの少なくとも一部を優先的に表示できるから、さらに見易いルート表示が実現され、より使用性が高まる。

【0016】本発明の第10の構成に係るルート案内システムは、第1乃至第9の構成において、上記携帯端末が、上記現在地情報を無線送信する手段を備え、上記無線機が、上記現在地情報を無線受信する手段を備え、上記ルート案内システムが、上記無線機により無線受信された上記現在地情報を収集することにより上記利用者の動向を管理する手段を有することを特徴とする。本発明の第11の構成に係るルート案内システムは、第10の構成において、上記無線機が、上記携帯端末からの返答を求める返答要求信号を、必要に応じ無線送信する手段を備え、上記携帯端末が、上記返答要求信号を無線受信する手段と、当該返答要求信号に応じ上記現在地情報の無線送信を実行させる手段と、を備えることを特徴とする。これらの構成においては、利用者の動向が常に又は

定期的に把握される。特に、第11の構成においては、返答要求信号の送信及びその受信に応じた現在地情報の送受信を介し随時利用者の動向を知ることができるから、第3の構成に係る呼出し等をより好適に実行可能になる。

【0017】本発明の第12の構成に係るルート案内システムは、第1乃至第11の構成において、上記携帯端末が、その携帯端末の利用者の身体に当該携帯端末を着脱可能に固定するベルトを備えることを特徴とする。本構成においては、ベルトを用いた身体への装着により、利用者が携帯しやすい携帯端末が実現される。

【0018】

【発明の実施の形態】以下、図面に基づきかつ本発明を空港内のルート案内システムとして実施した場合を例として、本発明に関し説明する。なお、本発明は、空港ビル以外の建物、例えば駅やショッピングセンター等にも適用できる。

【0019】(1)システム構成

図1には、本発明の一実施形態に係る空港内ルート案内システムの一例が示されている。このシステムは、携帯端末10、無線機20、中間コントローラ30及び管理コンピュータ40から構成されており、さらにフライトシステム50と接続されている。

【0020】これらのうち携帯端末10は、空港ビルの利用者、例えば搭乗待ちの旅客がそれぞれ1個ずつ携帯する小型の無線端末であり、利用者に対し、その現在地、現在地から目的地に至るルート、管理コンピュータ40からのメッセージ、ルート外れを警告するメッセージ等を提供する機能を有している。また、携帯端末10は、後述する無線周波数F1〜Fmをスキャンするマルチスキャン機能や、受信した信号の無線周波数にて返答を送信する機能を備えている。携帯端末10は、近接電磁界通信が可能であればよいと、無線端末としては省電力・小形である。

【0021】各無線機20は、対応する中間コントローラ30又はこれを介した管理コンピュータ40からの指令に応じ、あるいは携帯端末10における現在地演算のため定期的に、携帯端末10に宛てて無線信号を送信する無線中継機である。無線機20も、近接電磁界通信が可能であればよいと、無線中継機としては省電力・小形である。また、無線機20は、少なくとも旅客等が進入可能な全てのエリアをその電波範囲(携帯端末10への電波の送信及び携帯端末10からの電波の受信が可能な範囲)の網でカバーできるよう、空港ビル内に分散配置されている。従って、そのようなエリア内では、相隣接する無線機20の電波範囲は一般に互いに一部重複している。本実施形態では、このように無線機20を配置しているため、各携帯端末10は常にいずれかの無線機20から無線信号を受信できる。すなわち、従来のビーコンシステムで生じていたような空白エリアは生じな

い。無論、屋外のインフラストラクチャを利用したりまた屋外に新たなインフラストラクチャを設ける必要もない。

【0022】さらに、各無線機20には、その電波範囲が重複する（一般には相隣り合う）無線機20同士が同じ無線周波数を使用することとならないよう、すなわち無線機20同士の無線信号が衝突しないよう、F1～Fm（m：2以上の自然数）のうちいずれかの無線周波数が割り当てられており、各無線機20は割り当てられた無線周波数にて無線信号を送受信する。仮に、相隣接する無線機20に同一無線周波数を割り当てたとすると、複数の無線機20の電波範囲に重複所属している領域において、これらの無線機20からの無線信号が衝突し正常な無線通信を確保し得ないこととなり得るが、本実施形態ではそのような支障は生じない。

【0023】さらに、無線機20からの無線信号には、その無線機20に固有の無線IDが含まれており各携帯端末10はこれを送元たる無線機20及びその位置の特定に使用している。上述のような無線周波数割当ては、送元たる無線機20の特定にも寄与し得る。すなわち、後述の手順により無線周波数と無線機IDの対応付けを終えた後利用者があまり移動しない間であれば、仮に無線機IDを好適に検出できなかった場合でも、検出した無線周波数を基に、送元たる無線機20を区別又は特定できる。

【0024】なお、空港ビル及びその周辺では航空管制その他の目的で各種の無線システムが使用されているが、本実施形態に係るシステムは基本的には弱電界のシステムであり、また使用する無線周波数もこれらの無線システムと異なるから、これらの無線システムとの相互干渉は生じにくい。スペクトル拡散その他の無線技術の利用も可能である。

【0025】中間コントローラ30は一般に複数設けられており、それぞれ一般に複数の無線機20を管理する。管理コンピュータ40は一般に複数の中間コントローラ30を管理する。なお、システムが小規模な場合は中間コントローラ30を設ける必要はない。

【0026】(2) 携帯端末の構成

図2には、携帯端末10の外観が示されている。携帯端末10の筐体の表面には、ルート表示欄11、項目表示欄12、メッセージ表示欄13及び複数の押し釦14が設けられており、背面にはベルト15が設けられており、側面にはカードポート（図示せず）が設けられている。ルート表示欄11、項目表示欄12及びメッセージ表示欄13は、携帯を可能にするため、LCD等のように小型で平板状の表示デバイスにて実現するのが好ましい。押し釦14は、項目表示欄12に表示されている項目を利用者が選択できるようにするために、項目表示欄12と並んで設けられている。押し釦14に代え、タッチパネル等を用いても構わない。ベルト15は、携帯端

末10を利用者の腕等に固定する手段である。ベルト15を用いた身体への装着により、利用者が携帯しやすくなる。ベルト15は携帯端末10の本体に着脱可能であり、利用者は自分の好みでベルト15を使用／不使用とすることができる。カードポートは、空港ビルの屋内地図が情報として格納されているICカード16を着脱可能なデータ入力ポートである。

【0027】携帯端末10は、そのルート表示欄11上に、現在地から目的地に至るルートを、空港ビルの屋内地図と重ねて表示させる。このような表示を実現するためには、屋内地図情報、目的地情報及び現在地情報が必要である。携帯端末10は、これらのうち屋内地図情報を、そのカードポートに装着されたICカード16から読み出す。ICカード16の交換により屋内地図情報を更新乃至変更できるため、ICカード16の交換のみで、空港ビルの屋内交通状況の変更・変化（空港ビルの新築・増改築、一方通行規制の変更、一時的な進入規制等）に対処でき、また本実施形態における携帯端末10を他の建物（例えば駅）に転用できる。

【0028】目的地情報は、項目表示欄12及び押し釦14を用いた階層的な入力操作（後述）により利用者から与えられる。すなわち、利用者は、項目表示欄12に表示されている項目のうちいずれかを、その項目の横にある押し釦14の操作により選択する、という簡便な操作の繰返しにより、携帯端末10に自分の目的地を設定する。目的地情報は、搭乗便の出発時刻が切迫しているとき等には、管理コンピュータ40等から呼出し先情報として与えられる。

【0029】携帯端末10は、図示しないが、無線機20との間で情報を無線送受信するための無線回路や、無線送受信に係る情報を処理するための処理回路を内蔵している。現在地情報は、無線機20から無線送信される情報のうち無線機IDと呼ばれその無線機20の位置を示す情報に基づき生成される。その手順に関しては後述する。

【0030】このようにして、空港ビルの屋内地図を示す屋内地図情報と、利用者の目的地を示す目的地情報と、利用者の現在地を示す現在地情報とが得られると、携帯端末10は、現在地から目的地に至るルートを求め、求めたルートを、そのルートを含む屋内地図と重ね合わせてかつ現在地や目的地と共にルート表示欄11上に表示する。本実施形態では、その際、携帯端末10により現在地や目的地、さらにはルート周辺の目立つ設備（トイレ、レストラン、エスカレータ、モニュメント等）を文字や目立つ記号で表示させることにより、利用者による視認性能を高めている。また、本実施形態では、現在地、目的地及びルートを表示する際、携帯端末10により併せて目的地までの距離や所要時間を屋内地図情報や平均的な歩行速度等に基づき計算させ表示させることにより、使用性を向上させている。

【0031】また、携帯端末10は、管理コンピュータ40等からのメッセージが無線受信されている場合にはそのメッセージを、利用者が移動した結果その現在地がルートから外れた場合にはその旨のメッセージを、メッセージ表示欄13により表示させる。

【0032】(3) アドレス構造

無線機20の位置、携帯端末10の現在地及び目的地、さらには屋内地図情報を構成する各設備の位置は、本実施形態では、図3に示される構造を有するアドレスにて表現される。すなわち、この実施形態では、空港ビル内における三次元的な位置を表記するために、図3に示される構造を有するアドレス表記“〇-〇-〇-〇-〇-〇”を採用している。

【0033】この表記“〇-〇-〇-〇-〇-〇”のうち最初の数字乃至記号“〇”はいずれかの「階」を、これに続く数字乃至記号“〇-〇”はその「階」の中のいずれかの「ページ」を、さらにこれに続く数字乃至記号“〇〇-〇”はその「ページ」の中のいずれかの「アドレス」を、それぞれ特定している。また、「ページ」は図3(b)に示されるようにその所属「階」の行列区画であり、「ページ」“〇-〇”のうち最初の“〇”は行を、後の“〇”は列を、それぞれ示している。「アドレス」は図3(c)に示されるようにその所属「ページ」の行列区画であり、「アドレス」“〇〇-〇”のうち最初の“〇〇”は行を、後の“〇”は列を、それぞれ示している。例えばアドレス“1-3-3-01-A”は、「1階」の「第3-3ページ」の「アドレス01-A」を意味する。このような階層的なアドレス表記を使用することにより、空港ビル内の位置を、高い分解能で、表記及び特定できる。例えば、先に説明した無線機20の配置の一例をページ“1-3-3”を例として示すと、図3(c)のようになる。図中黒い星印は無線機20の位置を、円はその電波範囲を、それぞれ示している。

【0034】また、ICカード16上の屋内地図情報(カードデータ)も、このアドレスを用いて記述されている。例えばトイレに関するカードデータは、図4(a)に示されるように、そのトイレの特徴(一般用か、障害者用か等)、そのトイレが占有しているアドレスの範囲、及びそのトイレが面しているブロック(アドレスが付与される最小の単位。図3(c)参照)の個数を互いに対応付けた構成を有している。さらに、レストランに関するカードデータは、図4(b)に示されるように、そのレストランの特徴(洋食か、和食か、ファーストフードか等)、そのレストランが占有しているアドレスの範囲、及びそのレストランが面しているブロックの個数を互いに対応付けた構成を有している。また、階間移動装置に関するカードデータは、図4(c)に示されるように、その階間移動装置の特徴(エレベータかエスカレータか等)、並びにその階間移動装置の始点及び終点(必要な場合には経由点も)のアドレスを互いに対

応付けた構成を有している。

【0035】このように、本実施形態においては、利用者が頻繁に利用するであろう設備や利用者が利用する確率の高い設備に関する情報を、ICカード16上にデータベース化している。すなわち、空港ビルの屋内地図映像データそのものではなく、空港ビル内にある各種の設備(トイレ、レストラン、エレベータ、モニュメント等)の位置を示す情報の集合を地図情報としてICカード16上に格納しているため、地図情報の情報量が少なく済む。これは、ICカード16の記憶容量節約・低廉化や、携帯端末10の小型化・低廉化に役立っている。

【0036】なお、ここでは、空港ビルが図3(a)に示されるように地上N階地下M階(N, M: 自然数、 $N+M>2$)の建物であると考えており、また各「階」をn行n列(n: 自然数)に、各「ページ」を26行26列に、それぞれ行列区画しているが、このような建物構成及び区画は一例にすぎない。尚、本実施形態では現在地の判断用に後述のように無線機ID及び無線周波数を各携帯端末10が検出・収集する方式を採用しているが、ICカード16上にはルート外れか否かの判断用に無線機20の位置や無線周波数に関する情報を搭載している。

【0037】(4) 無線インタフェース

図5には、携帯端末10と無線機20の間で無線送受信される信号のフレーム構成、すなわち無線インタフェースの構成が示されている。特に図5(a)は無線機20から携帯端末10へ送信される無線機送信フレームの、図5(b)は携帯端末10から無線機20へ送信される携帯端末送信フレームの、構成を示している。無線機20は、対応する中間コントローラ30からの指令に応じ、又はこの中間コントローラ30を介した管理コンピュータ40からの指令に応じ、無線機送信フレームを無線送信する。また、いずれかの無線機20から無線機送信フレームを受信した携帯端末10は、その無線機送信フレームが所定の条件を満たしている場合、携帯端末送信フレームを無線送信する。

【0038】無線機送信フレームは、“無線機ID”、“メッセージ有無フラグ”、“呼出し先アドレス”、“携帯端末ID”、“メッセージ”及び“返答要求有無フラグ”を含んでいる。これらのうち“無線機ID”及び“携帯端末ID”は、その無線フレームの送元及び宛先を特定する情報であり、それぞれ、送元たる無線機20及び宛先たる携帯端末10に固有の識別符号である。この実施形態では無線機20が固定的に配置されているから、“無線機ID”としては、その無線機20の位置を示し図3に従い表記されたアドレスを用いている。また、“メッセージ”は管理コンピュータ40等が宛先たる携帯端末10の利用者に伝達したがっている情報であり、“メッセージ有無フラグ”はその無線機送信フレ

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ムに“メッセージ”が含まれているか否かを示すフラグである。“呼出し先アドレス”は、管理コンピュータ40等が宛先たる携帯端末10の利用者を特定の場所（例えば搭乗口）に呼び出したいときに、当該利用者に呼出し先の場所を知らせるために使用され、上述のアドレス表記に従い記述される。“返答要求有無フラグ”は、その無線機送信フレームが、宛先たる携帯端末10からの返答を必要とする性格のフレームであるか否かを示すフラグである。

【0039】携帯端末送信フレームは、“携帯端末ID”、“確認有無フラグ”及び“現在地アドレス”を含んでいる。これらのうち“携帯端末ID”は送元たる携帯端末10に固有の識別符号である。また、“確認有無フラグ”は、先立って受信した無線機送信フレーム中の“メッセージ”を利用者が確認したか否かを示すフラグである。“現在地アドレス”は送元たる携帯端末10及びその利用者の現在地を示す情報であり図3に従い表記される。

【0040】これらのフレームには、携帯端末10に対し又は無線機20に対し動作指令を与える情報（コマンド）が含まれていない。すなわち、本実施形態にて使用される無線フレームは各種の移動無線等にて採用されているものよりも簡単かつ単調な構成であり、従って無線機20及び携帯端末10における無線制御が簡単である。なお、本発明は無線インタフェースの細部に限定を要するものではない。

【0041】(5)施設部分の動作

管理コンピュータ40及び中間コントローラ30は、図6及び図7に示される手順に従って動作する。これらの図のうち図6は定時一斉同報に係る手順であり、図7は特定利用者へのメッセージ送信や特定利用者の呼出しのため実行される手順である。

【0042】まず、図6に示されるように、各中間コントローラ30はそれぞれその管理下にあるすべての無線機20に対し、定時一斉同報を指令する(100)。この定時一斉同報指令は、無線機送信フレームに含まれるべき情報のうち、無線機IDを除く情報を含んでいる。無線機20は、対応する中間コントローラ30から定時一斉同報指令を受信したとき(102)、その指令に含まれる情報及び自己の無線機IDに基づき無線機送信フレームを構成し(104)、この無線機送信フレームを自分に割り当てられている無線周波数にて無線送信する(106)。

【0043】一方、携帯端末10は、常に、無線周波数F1～Fmにおける信号受信有無をモニタしている（無線周波数のマルチスキャン）。携帯端末10は、このマルチスキャンによりいずれかの無線機20からの無線機送信フレームの受信を検出したとき(108)、まずこの無線機送信フレームに返答すべきか否かを判断し(110)、返答すべきであると判断した場合にのみ、無線

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機20から受信した無線機送信フレームに係る無線周波数と同一の無線周波数にて、かつその無線周波数により無線機20が送信を行っていないタイミングで、携帯端末送信フレームを送信する(112)。

【0044】無線機20は、いずれかの携帯端末10から携帯端末送信フレームを受信したとき(114)、その携帯端末送信フレームに含まれている情報及び自分の無線機IDを(116)、対応する中間コントローラ30に送信する(118)。中間コントローラ30は、自分の管理下にある無線機20から受信した情報を(120)、少なくとも状態監視信号を受信するまで保持する(122)。管理コンピュータ40は、自分の管理下にある中間コントローラ30に対し、定期的に状態監視信号を送信する(124)。状態監視信号を受信すると(126)、中間コントローラ30は保持している情報を管理コンピュータ40に送信する(128)。このようにして中間コントローラ30から携帯端末10に関する情報を受信した管理コンピュータ40は(130)、受信した情報に基づき旅客情報を修正し(132)、これを管理コンピュータ40の操作者に提供すべく表示装置の画面上に表示する(134)。

【0045】ここにいう旅客情報とは、図8(b)に示されるように、各携帯端末10の携帯端末ID、その携帯端末10を携帯している利用者の氏名、その利用者が搭乗する予定の便の便名、その利用者の現在地アドレス等から構成されている。従って、“返答要求有無フラグ”＝“有”の無線機送信フレームの送信を指令する定時一斉同報指令を定期的に発し、その結果各携帯端末10から返信される携帯端末送信フレーム中の“現在地アドレス”をステップ114～130の動作にて管理コンピュータ40に収集し、これに基づき旅客情報を修正すれば、各利用者が今どこにいるのかを、適当な頻度で管理コンピュータ40が把握することができる。なお、図6に示される手順を好適に実行するためには、旅客情報が管理コンピュータ40に初期登録されていなければならない。初期登録の手順に関しては簡略化のためここでは説明を省略しているが、例えば、これから空港ビルを利用しようとしている者に携帯端末10又はICカード16を貸与する際その者が申告した情報や、後述のフライト情報を用いれば、そのような初期登録を行えることは理解されるであろう。

【0046】管理コンピュータ40は、このような定期的な旅客情報の更新・保守の他に、旅客情報を利用した各利用者の動向把握・管理に関連する処理を実行する。すなわち、図7に示されるように、管理コンピュータ40は、フライトシステム50からフライト情報を入力し、これを自分が保持している旅客情報と比較照合する(136)。フライト情報は、図8(a)に示されるように、発着予定便の便名、その便の発着予定時刻、その便に関する有意な情報（例えばキャンセルか否か）等か

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ら構成されている。従って、フライト情報と旅客情報とを照らし合わせるにより、出発時刻が迫っている便に搭乗する予定の旅客（携帯端末10の利用者）等を特定することができ、また出発時刻が迫っている便に搭乗する予定でまだ搭乗していない旅客（携帯端末10の利用者）等を特定することができる。そのような特定利用者に対しては、「〇〇×××便の発着時刻は〇〇：〇〇です」等のように利用者による確認を必要とするメッセージの送信や、「第〇〇搭乗ゲートへおいで下さい」等の特定の場所への特定の利用者の呼出しを行うことが必要である。

【0047】そこで、管理コンピュータ40は、フライト情報と旅客情報との照合結果に応じ、上述のメッセージ等を含み無線機送信フレームに含まれるべき情報（無線機IDを除く）、すなわち送信データを作成し（138）、これを各中間コントローラ30に送信する（140）。管理コンピュータ40からこの送信データを受信したとき（142）、中間コントローラ30は、これを自分の管理下にある無線機に送信する（144）。以後、図6の手順と同様にしてステップ102～120及び130～134が実行される（状態監視信号に関するステップ122～126はここでは実行する必要がない）。管理コンピュータ40は、メッセージ送信先たる利用者又は呼出し対象たる利用者の携帯端末10から“確認有無フラグ”＝“有”の携帯端末送信フレームが送信されたことをステップ130にて検出するまでは、その利用者に関し図7の手順を繰り返し実行する。これにより、特定の利用者に必要なメッセージを伝達でき、また特定の利用者を特定の場所に呼び出すことができる。

【0048】また、“確認有無フラグ”が“有”か“無”かに関わらずステップ132にて旅客情報を修正しステップ134にてこれを表示しているから、例えば所定回数呼出しを行ったにも関わらず確認有りの携帯端末送信フレームをその特定利用者の携帯端末10が送信していない場合等でも、管理コンピュータ40の操作者はその特定利用者の現在地（＝現在地アドレス）を知ることができる。従って、管理コンピュータ40の操作者又はこの操作者から連絡を受けた空港係員がその特定利用者の現在地まで駆け付けすることができる。これは、搭乗便の出発時刻が切迫しているのにまだ搭乗していない旅客を搭乗口まで案内する処置や、急病にみまわれ携帯端末10を操作できない状況で倒れている利用者の発見・対処等に役立つ。特に、ステップ134にて当該特定利用者の応答履歴を警告表示するようにすれば、上述のような状況を早期に把握することが容易になる。

【0049】さらに、図6及び図7に示される手順を利用して、各携帯端末10にフライトスケジュールを送信することもできる。その際には、無線機送信フレーム中の“メッセージ”にフライトスケジュール情報を設定

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し、“メッセージ有無フラグ”及び“返答要求有無フラグ”をそれぞれ“有”及び“無”に設定すればよい。

【0050】図9には、図6及び図7におけるステップ108～112の機能を実現するため携帯端末10により所定頻度で繰り返し実行される無線機送信フレームへの応答手順が示されている。この図に示される手順は、その携帯端末10が無線機送信フレームを受信し（200）かつその無線機送信フレーム中の“携帯端末ID”が自分の携帯端末IDと同じであったとき（202）、すなわち携帯端末10が自分宛ての無線機送信フレームを受信したときに実行される。携帯端末10による応答はこのように受動的であるため、本実施形態では、空港ビル内における無線トラフィックを管理コンピュータ40や中間コントローラ30の側で制御又は設定することができる。また、すべての携帯端末10を呼び出すことができるあるいは複数の携帯端末10を同時に呼び出すことができる特殊なIDを予め準備しておくことが可能なシステムに本発明を適用する場合には、ステップ204移行の動作を、無線機送信フレーム中の“携帯端末ID”がその特殊なIDと同じであったときもその携帯端末10により実行させることができる。このようにすれば、システムに含まれるすべての又は上記特殊なIDを共有する複数の携帯端末10に対し、同じメッセージを同時に伝達し又は同じ場所へ同時に呼び出すことが可能になる。

【0051】自分宛ての無線機送信フレームを受信した携帯端末10は、その無線機送信フレーム中の“メッセージ有無フラグ”及び“返答要求有無フラグ”の値を検出する（204、206、212）。“メッセージ有無フラグ”がメッセージ“無”を示す値である場合には（204）、無線機20側がその携帯端末10の利用者にメッセージを伝達しようとしていない、と見なせるため、その携帯端末10はメッセージ表示等の動作を実行しないまま、図9の動作を終了する。但し、“メッセージ有無フラグ”がそれぞれメッセージ“無”を示す値であっても、“返答要求有無フラグ”が返答要求“有”を示す値である場合には（206）、無線機20側がその携帯端末10に対し返答を要求している、と見なせるため、その携帯端末10は後述の動作により逐次生成される現在地アドレスを含む携帯端末送信フレームを無線送信する（208）。なお、ステップ208における送信は、送信先の無線機20又はこれと同一無線周波数の無線機20からの送信が停止しているときに実行する。ステップ204が実行された後ステップ208を実行せずに図9の動作を終了する状況の一例としては、携帯端末10に現在地判定（後述）を行わせるための送信が定時一斉同報指令等に応じ行われた状況を掲げることができる。ステップ208が実行される状況の一例としては、携帯端末10の現在地アドレスの収集や機能確認のための送信が定時一斉同報指令等に応じ行われた状況を掲げるこ

とができる。

【0052】“メッセージ有無フラグ”がメッセージ“有”を示す値である場合には(204)、携帯端末10は、その無線機送信フレーム中の“メッセージ”をそのまま又は文字若しくは記号情報に変換し、メッセージ表示欄13上に例えば図10のような形で表示させる(210)。このとき、頻繁に使用されるであろうメッセージを予めICカード16上に又は携帯端末10内部の記憶素子上にコード化して格納しておけば、受信した無線機送信フレーム中の“メッセージ”を文字又は記号情報に変換する処理を高速化できる。また、メッセージ表示と共に音響や振動を発生するようにすれば、利用者がメッセージ受信に容易に気付くことができる。

【0053】図10においては、メッセージ表示欄13上に「搭乗口までおいで下さい。確認釦を押して下さい」等のメッセージが表示されるから、その携帯端末10の利用者は、表示されたメッセージを読むことにより、例えば搭乗時刻の到来等を知ることができる。また、このときいずれかの押し釦14に確認釦の機能を割り当てその押し釦14の横(項目表示欄12上)に「確認」と表示しておけば、利用者がメッセージ受領を確認したことを、後述するステップ214以降の処理にて確認することが可能になる。特に、表示されるメッセージに図10に示されるように「確認釦を押して下さい」等と付記しておけば、利用者による確認操作(確認釦たる押し釦14の操作)を促すことができる。なお、メッセージの内容はこのような呼出しに限られるものではなく、フライト情報の提供、商業宣伝的な情報の提供、外部からの伝言の中継、空港施設の利用案内、法令の紹介等でもよい。

【0054】さらに、図10の例ではルート表示欄11とメッセージ表示欄13が同時に現れているが、図10上のルート表示欄11及びメッセージ表示欄13双方の画面領域を、メッセージ表示時には共にメッセージ表示欄13として用い、逆にメッセージ非表示時には共にルート表示欄11として用いることも可能である。このようにすれば、メッセージ表示時にはメッセージを、メッセージ非表示時にはルートを、それぞれ大きく表示することができる。また、図10上のルート表示欄11及びメッセージ表示欄13双方の画面領域を、利用者が目的地までの誘導を希望していないときには共にメッセージ表示欄13として用い、利用者が目的地までの誘導を希望しておりかつメッセージを受信していないときにはルート表示欄11として用い、利用者が目的地までの誘導を希望しておりかつメッセージを受信したときには図10に示される形態で用いることも可能である。いずれの使用法においても、各表示欄11～13をその必要性に応じて拡張・縮小・廃止しているため、画面の全体サイズを小さくすることが可能になり、携帯端末10の消費電力低減や小形化に貢献できる。

【0055】メッセージを表示した後、携帯端末10は、受信した無線機送信フレーム中の“返答要求有無フラグ”が返答要求“無”を示す値であれば図9の動作を終了し(212)、逆に返答要求“有”を示す値である場合には確認待ち動作に移行する。すなわち、携帯端末10は、確認釦たる押し釦14を利用者が操作するまで(214)、所定時間(例えば数分)を限度として待ち(216)、その間に利用者が確認釦を操作したら“確認有無フラグ”を確認“有”の値にセットした上で(218)携帯端末送信フレームを送信する(220)。ステップ220における送信も、送信先の無線機20又はこれと同一無線周波数の無線機20からの送信が停止しているときに実行する。

【0056】所定時間の経過にもかかわらず利用者が確認釦を操作しないときには、携帯端末10は、“確認有無フラグ”を確認“無”の値にセットし(222)携帯端末送信フレームを送信した上で(220)、再度ステップ214以降の確認待ち動作に移行する(224)。このように確認“無”でもその旨の携帯端末送信フレームを送信するようにしているため、管理コンピュータ40側ではメッセージ受領を確認していない利用者を検出・追跡することができ、場合によっては人手による連絡をつけることも可能になる。

【0057】確認待ち動作の繰返し実行により最終的に確認が得られたとき、すなわち“確認有無フラグ”が確認“有”の値を有する携帯端末送信フレームを送信した後には(224)、携帯端末10は、表示しているメッセージを消去すると共に(226)図9の動作を終了する。

30 【0058】(6)携帯端末の動作…現在地判定
携帯端末10においてルートを表示するためには、ルート情報の生成の基礎となる各種の情報、すなわち現在地情報、目的地情報及び屋内地図情報が必要である。本実施形態では、無線機20から送信され図3に示される表記に従う“無線機ID”に基づき、同様の表記に従う“現在地アドレス”を生成し、これを無線機20を介した返答要求に応じ無線送信すると共にルート決定・表示に使用している。“現在地アドレス”の無線送信に関しては図9に従い説明したため、ここではまず“現在地アドレス”の生成処理に関して説明し、後にルート決定・表示処理に関して説明する。

50 【0059】図11には、携帯端末10により所定頻度で繰返し実行される現在地判定手順が示されている。携帯端末10は、本システムにて使用され得るすべての無線周波数F1～Fmに関し(300)、監視対象たる無線周波数を逐次変更しながら(302)、無線機送信フレームの受信有無(304)を監視する(マルチスキャン)。無線機送信フレームを受信できたときには、前述の図9の動作を並列的に又は後に実行する一方で、その無線機送信フレームを搬送した無線周波数とその無線機

送信フレーム中の“無線機ID”を互いに対応付けて記憶する(306)。携帯端末10は、このような処理により、現在自分の近傍に位置している無線機20の無線周波数及び無線機IDを検出している。

【0060】マルチスキャンにもかかわらず無線機送信フレームを1個も受信できなかった場合(308)、携帯端末10は、何等かの理由で電波が遮蔽されていると見なし、現在地判定手順を終了する。この場合、例えば、従前の現在地判定手順で求めた“現在地アドレス”を引き続き使用する。

【0061】マルチスキャンにて無線機送信フレームの受信を検出できた無線周波数の個数が1個である場合(308)、携帯端末10は、自分の周囲には無線機20が1個しかないと見なし、その無線機送信フレーム中の“無線機ID”をそのまま“現在地アドレス”として使用する(310)。

【0062】マルチスキャンにて無線機送信フレームの受信を検出できた無線周波数の個数が2個以上である場合(308)、携帯端末10は、自分の周囲には複数個の無線機20がある(言い換えれば複数個の無線機20の電波範囲の重複範囲内に自分が位置している)と見なし、当該複数個の無線機20に係る複数個の無線機送信フレーム中の“無線機ID”の重心を求め、これを“現在地アドレス”として使用する(312)。図3(c)を例にとると、“無線機ID”=“1-3-3-09-F”の無線機20及び“無線機ID”=“1-3-3-09-L”の無線機20から無線機送信フレームを受信できる状況下では、両“無線機ID”の重心である“1-3-3-09-H”がその携帯端末10の“現在地アドレス”となる。このように、電波範囲の重複を利用することにより、無線機20の配置間隔よりも良い分解能で、現在地アドレスを決定できる。

【0063】但し、実際には、“現在地アドレス”の演算に使用し得ない“無線機ID”もある。例えば、利用者が階段脇を通り掛かったときには、利用者の現在階に配置されている無線機20から無線機送信フレームを受信できるばかりでなく、その上又は下の階に配置されている無線機20からも階段の吹抜け空間や踊り場空間を介して無線機送信フレームを受信できる。このような状況下で、上又は下の階に配置されている無線機20の“無線機ID”を“現在地アドレス”の演算に使用してしまうと、利用者が単に階段脇を通り掛かったのみであり実際は他の階への移動を意図してはいないときであっても、他の階にあるアドレスが“現在地アドレス”とされることになりかねない。これは、ルート決定・表示に際して支障となるため、本実施形態では、所定条件を満たす“無線機ID”を次のような手順で“現在地アドレス”の演算から除外している。

【0064】マルチスキャンにて無線機送信フレームの受信を検出できた無線周波数の個数が2個以上である場

合(308)、携帯端末10は、まず、それらの無線機送信フレーム中の“無線機ID”を参照し、当該複数個の無線機送信フレームの送信元たる複数個の無線機20の所属階を判定する。当該複数個の無線機20がいずれも同じ階に属している場合(314)、携帯端末10は、当該複数個の無線機20に係る複数個の“無線機ID”を全て採用し、ステップ312を実行する(316)。逆に、当該複数個の無線機20の所属階が複数個の階に分布している場合(314)、携帯端末10は、受信できた無線機送信フレームの送信元たる無線機20の個数が最も多い階、すなわち最多所属階を求め(318)、最多所属階に属する無線機20の“無線機ID”を採用し(320)、採用した個数が1個であればステップ310を、2個以上であればステップ312を、それぞれ実行する(316)。これにより、間違いなく利用者を案内できかつ利用者の現在地を管理コンピュータ40が収集できるようになる。

【0065】但し、最多所属階が複数個ある場合(322)、そのうち従前の“現在地アドレス”が属していた階(従前の“現在地アドレス”が属していた階が最多所属階でない場合には、これに最も近い階)に属する無線機20の“無線機ID”を採用し(324)、採用した個数が1個であればステップ310を、2個以上であればステップ312を、それぞれ実行する(316)。

【0066】(7)携帯端末の動作…ルート決定

図12には、図11に示される手順により決定された各携帯端末10の現在地を利用してルートを求めるルート決定手順が示されている。この手順は、各携帯端末10により所定頻度で繰り返し実行される。

【0067】本実施形態では、まず、無線機送信フレーム中の“呼出し先アドレス”に何等かのアドレスが設定されているか否かが携帯端末10により判定される(400)。“呼出し先アドレス”に何等かのアドレスが設定されていると判定したときには、携帯端末10は、管理コンピュータ40がその携帯端末10の利用者をそのアドレスに呼び寄せたがっていると見なし、図11の手順にて決定された現在地アドレス、ステップ400にて判定検出した“呼出し先アドレス”及びICカード16上の屋内地図情報に基づき、現在地から呼出し先までのルートを求め(402)、現在地、目的地、ルート、ルート周辺の目印たる設備等を図13に示されるような形でルート表示欄11上に表示させる(404)。ルートを求める際には、壁の存在、通路の一方通行規制等を考慮し、これらの制約条件を満たしながら最も道程が短いルートを算出する。これにより、空港ビルを全く又はほとんど利用したことがない不案内な利用者でも、誘導を受けながら、呼出し先まで躊躇せずに最短時間でたどりつくことができる。

【0068】但し、呼出し先が目近にある場合やその利用者が空港ビル内の地理を熟知している場合のように利

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10 用者が誘導を希望しないこともあることから、ステップ400からステップ402に移行するのに先立って、携帯端末10は、図14に示されるように「ご案内致しましょうか」等の文字列又は記号列をメッセージ表示欄13上に表示させると共に、いずれか2個の押し釦14に誘導可否入力釦機能を割り当てその押し釦14の横項目表示欄12上に「する」「しない」等と表示させる(406)。携帯端末10は、利用者が「する」の押し釦14を操作したときにはステップ402へ移行し、「しない」の押し釦14を操作したときには図12の手順を終了する。

【0069】なお、図14ではルート表示欄11上にルートが表示されていないが、すでに決定済みのルートがある場合にはそのルートを引き続き表示しておいてもよい。また、ルート表示欄11とメッセージ表示欄13の相対関係に関しては、ステップ210に関して前述した通り変形可能である。

【0070】“呼出し先アドレス”に何もアドレスが設定されていないと判定したときには(400)、携帯端末10は、利用者による目的地の入力を待つ(408)。携帯端末10は、利用者による目的地の入力を促すため、図15最上段に示されるように、「目的地をご入力下さい」等の文字列又は記号列をメッセージ表示欄13上に表示させ、同時に、目的地の候補をそれぞれいずれかの押し釦14に対応するよう項目表示欄12上に列記表示させその押し釦14にその候補を選択する機能を割り当てる。但し、少なくとも1個の押し釦14に関しては、入力終了釦の機能を割り当てる。

【0071】本実施形態における利用者による目的地の入力は階層的な構造による入力であり、目的地の大きな分類乃至特徴から細かな分類乃至特徴へと順に利用者が選択指定していく方法を採用している。例えば、入力の最初の段階では項目表示欄12に「搭乗口」「待合」その他の大まかな分類が表示され、利用者がその中の例えば「レストラン」に対応する押し釦14を操作すると「現在の階」等さらに細かな分類が表示される。図15の例では、設備の分類→所属階→特徴(ここではレストランの種別)→設備の名称の順での階層的目的地入力が行われている。また、利用者は、目的地入力の間常に設けられている「入力終了」の押し釦14を操作することにより、任意の入力段階で目的地入力を終了することができる。利用者が目的地を大まかにでも選択することなしに目的地入力終了を選択したときには、携帯端末10は図12の動作を終了する。

【0072】なお、図15上から2段目の「階」入力画面に項目「現在の階」があるのは、利用者自身が現在階を知っていない場合に対処するためである。また、現在表示されている項目の選択を避け次の画面にて項目を選択できるよう、次の分類へのスキップを指令する機能をいずれかの押し釦14に割り当てておいてもよい。

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【0073】利用者が目的地を大まかにでも選択した上で目的地入力終了を選択したときには、携帯端末10は、当該選択の結果から目的地のアドレスを特定できるか否かを判断し(410)、特定できると判断した場合にはそのままステップ402に移行しルート決定及び表示を実行する。例えば、利用者が目的地たるレストランの名称まで選択した上で目的地入力終了を選択したときには、図4(b)に示されているカードデータを利用して目的地のアドレスを決定できると判断する。従って、利用者は、項目表示欄12の表示を読みながら押し釦14を数回操作するだけで、効率よく、目的地を入力することができる。

【0074】逆に、利用者がレストランを選択しただけでその所属階も種別も名称も選択していないとき等には、それだけでは目的地のアドレスを特定できないと判断する。特定できないと判断した場合、携帯端末10は、選択入力されている部分的な目的地条件に合致する目的地候補をICカード16上のカードデータから検索し(412)、検索により得られた目的地候補までの道程を壁の存在、一方通行規制等を考慮しながらそれぞれ求め(414)、求めた道程が最も短い目的地候補のアドレスを目的地アドレスとして選択し(416)、その上でステップ402に移行する。

【0075】例えば、利用者がレストランを選択しただけのときには、空港ビル内のレストランのうち利用者の現在地に最も近い(最も道程が短く従って最も早くたどり着ける)レストランが、携帯端末10により目的地に自動設定される。従って、最も近いところにある設備の利用を望んでいる利用者にとっては、目的地の細かな選択指定操作を省略できるため、至便性が高い。例えば“トイレを探しているとき”や“手っ取り早く食事ができればどの様な食事でもよいとき”には、この機能は特に有効である。

【0076】さらに、ステップ412において目的地候補を検索するときに、それまでに利用者が選択指定している目的地条件に応じ、検索条件に予め制約を設けるようにすれば、ステップ412～416の処理を高速化し早期にルートを決定することが可能である。また、この制約処理は、空港ビルの福祉向上にも役立つ。例えば、利用者が目的地を“トイレ”の段階まで選択指定しただけで一般用かそれとも障害者用かを指定していないときには、図4(a)に示されるカードデータのうち身体障害者用に確保しておくべき障害者用トイレを、ステップ412における検索対象から除外することにより、障害者用トイレしか利用できない身体障害者をトイレ混雑等の不便から保護することができる。

【0077】(8) 携帯端末の動作…ルート外れリカバリ

図16には、携帯端末10により所定頻度で繰り返し実行されるルート外れリカバリ手順が示されている。この

手順は、携帯端末10のルート表示欄11上に表示されているルートから利用者が大きく外れた場合にもその利用者を目的地まで誘導できるようにするための手順であり、図12に示される手順により既にルートが決定されている場合に実行される(500)。

【0078】ルート外れリカバリ手順においては、ステップ306にて記憶・収集済みの無線周波数・無線ID対、ステップ310又は312にて求めた現在地アドレス、及び図12の手順にて決定済のルートに基づき、その携帯端末10がこれから受信するであろう無線機送信フレームの無線周波数及び無線機IDを少なくとも1タイミン分子予測する(502)。すなわち、携帯端末10は、まず、ステップ310又は312にて求めた現在地アドレスを始点として決定済のルートに沿い利用者が移動した後の携帯端末10のアドレス(移動後の現在地アドレス)を予測し、次に、その移動後の現在地アドレスの近傍にある無線機20が使用している無線周波数及び無線機IDを、ステップ306にて収集した情報から決定することにより、近い将来受信できる無線周波数及び無線機IDを予測する。

【0079】携帯端末10は、受信した無線機送信フレームの無線周波数及び無線機IDを予測と比較する(504)。携帯端末10は、予測通りの無線周波数及び無線機IDを検出したときには、現在地、目的地及びルートの表示を継続する(506~510)。すなわち、現在地の所属ページに変化がないときには(506)、携帯端末10は、現在地を示す文字又は記号(図13の例では黒丸)の位置を変化させる(508)。これにより、利用者はルートに沿った現在地変化をルート表示欄11上で目で追うことができる。また現在地の所属ページに変化があるときには(506)、携帯端末10は、後述の画面自動拡大を含めた処理を実行する(510)。

【0080】逆に、予測に達えた無線周波数及び無線機IDを検出したときには(504)、携帯端末10は、図17に示されるようにルート外れを利用者に知らせ再誘導可否を問う「目的地までのルートから外れています。ご案内致しましょうか」等のメッセージを、メッセージ表示欄13上に表示させる(512)。携帯端末10は、ルート外れ/再誘導可否表示の際には、いずれか2個の押し釦14に「する」「しない」等の選択機能を割り当て、項目表示欄12上にはその押し釦14と並ぶよう「する」「しない」等の文字列又は記号列を表示させる。

【0081】利用者が「しない」を選択するための押し釦14を操作したときには、携帯端末10は再誘導不要であると判定し(514)、ステップ506に移行する。この場合には、ルート表示欄11上に、引き続き図17のような映像が表示される。利用者は、この映像による支援を受け、ルートに復帰することができる。ルー

ト復帰によりステップ504にて予測との一致が検出されるに至ったときには、ルート外れ/再誘導可否表示は消去される(520)。なお、ルート外れ/再誘導可否表示を行っているときに(522)ステップ502を省略しているのは、前回ステップ502を実行したときに予測した情報をルート復帰直後まで保持しその時点で利用することを可能にするためである。

【0082】自力でルートに復帰できない場合には、利用者は図17の状態で「する」を選択するための押し釦14を操作すればよい。これに応じ(514)、携帯端末10は、現在地から目的地に至るルートをステップ402と同様の手順で再決定し(516)、ルート外れ/再誘導可否表示を消去した上で(518)、ステップ506に移行する。ステップ506では現在地の変化のみならずルートの変化も判定検出しており、ルート再作成後のようにルートが変化している場合はステップ510が実行される。従って、ルートに自力復帰できないときでも、利用者は、現在地から目的地へ改めてルート誘導を受けることができる。

20 【0083】(9) 携帯端末の動作…表示制御

前述のステップ404及び510は、現在地、目的地、ルート等をルート表示欄11上に表示させる機能を提供している。携帯端末10は、この機能を、図18に示される現在地・目的地・ルート表示手順を実行することにより実現している。また、複数の階を有する空港ビルにおいては現在地から目的地に至るルートが複数の階にまたがるのが往々にしてあるため、本実施形態では、そのようなルートを表示する際にもルート表示欄11上の映像から利用者が直観的にルートを把握できるように、表示方法を工夫している。

【0084】本実施形態では、携帯端末10は、まず、現在地から目的地に至るルートがよぎるページを、表示候補として選び出す(600)。後に説明するように、表示候補として選び出されたページは、現在地、目的地、ルート、ルート近傍の目立つ設備等と共に、ルート表示欄11による表示の対象となる。但し、ルート外れ発生時のように現在地のアドレスがこれらのページに属していないことがあるから、ステップ600では現在地アドレスの所属ページも併せて表示候補として選び出す。

【0085】携帯端末10は、次に、選び出した表示候補が全て同じ階に属しているか否かを判定する(602)。属していると判定したときには、携帯端末10は、表示候補全てを包含する最小の四角形を求め、この四角形に属する全てのページを表示候補として選び出す(604)。例えば、ルートが図19(a)に示されるように横方向4ページ縦方向4ページの広がりを持している場合には、この4ページ×4ページの正方形に属する合計16ページが、表示候補となる。携帯端末10は、表示候補にて構成される四角形の長辺がルート表示

欄11におさまるよう表示倍率＝ルート表示欄寸法／表示候補群の寸法を決定し(606)、決定した表示倍率に従いかつ現在地や目的地を示す記号又は文字やルートを示す線と重ねて、ルート表示欄11上に表示させる(608)。その際には、携帯端末10は、目的地までの距離や所要時間を併せて表示させる。また、ルート近傍にある設備を示す記号又は文字も、表示の対象とする。但し、ルート近傍にある全ての設備を表示するのは画面の見易さの点でも処理の負担の点でも好ましくないから、携帯端末10は、ステップ608に先立ち、表示

倍率に応じ、目立つ設備のみを選び出す(610)。目立つ設備のみを選択する処理は、カードデータ上のブロック数情報(図4(a)及び(b)参照)を利用し、ブロック数の大きな設備を選び出す、という手順で行う。
【0086】ここで、ステップ604までに選び出された一群の表示候補をそのまま表示したのでは、ルート表示欄11の画面に空きが生じる可能性がある。例えば、ルート表示欄11が常に正方形となるよう設計された携帯端末10を考える。このような携帯端末10を利用してルート表示を実行する際には、表示候補群により構成される四角形が正方形でなくてはならない。従って、ステップ604にて求められた四角形が正方形ではなく長方形である場合、縦横均等な倍率にて表示を行うと、その長方形の短辺側に欠けが生じる。そこで、携帯端末10は、ステップ606実行後、表示候補群四角形がルート表示欄11の画面四角形に適合しているか否か、すなわち両四角形が同一の形状(縦横比)を有しているか否かを判定し(612)、同一の形状を有している場合にのみ、ステップ604までに求めた表示候補群のみによる表示を実行し、同一の形状を有していない場合には不足辺(ルート表示欄11の画面四角形に対し表示候補群四角形が不足している部分)側へ表示候補を補填し、表示候補群四角形がルート表示欄11の画面四角形と同一の形状となるように調整する。なお、項目表示欄12やメッセージ表示欄の拡大縮小により、表示候補群四角形とルート表示欄11の画面四角形の形状の相違を補うようにしてもよい。

【0087】不足辺側へ表示候補を補填する際には、携帯端末10は、まず不足辺側に補うべきページ数を、ステップ604にて求めた四角形の寸法及びルート表示欄11の寸法に基づき演算する(614)。不足辺側に補うべきページ数から見てそれまでに踏破されたルートに係るページ(通過ページ)を表示可能である場合には(616)、携帯端末10は、通過ページを表示候補として選び出す(618)。それでもなお表示候補が不足する場合には(620)、携帯端末10は、表示候補に隣接するページの中から新たな表示候補を選び出す(622)。携帯端末10は、通過ページを表示可能でない場合もステップ622を実行する。ステップ620にて不足していないと判断したときやステップ622の実行

を終えたとき、携帯端末10の動作は、ステップ610に移行する。

【0088】このようにして実行される表示候補補填処理を概念的に表すと、図19のようになる。まず、図19(a)の例は、ステップ612にて“適合している”と判定される場合の例であり、この場合には表示候補の補填は行われない。次に、図19(b)～(d)の例は、いずれも、ステップ612にて“適合していない”と判定される場合の例である。なかでも図19(b)の例は通過ページのみにて補填する場合(ステップ616→618→620→610)の、図19(c)は通過ページ以外のページにて補填する場合(ステップ616→622→610)の、図19(d)は通過ページ及びそれ以外のページ双方にて補填する場合(ステップ616→618→620→622→610)の、例を示している。

【0089】このように、本実施形態においては、ルートの全体が必ず単一画面上に表示されるよう、またルートが最大表示されるよう、図20(a)に示されるように現在地の変化に伴い表示倍率を変化させているため、現在地の変化によらず常に見易いルート表示画面が得られ、高い使用性を実現できる。また、上述のように目印設備を併せて表示しているため、単に現在地、目的地及びルートを表示する場合に比べ、利用者を目的地に誘導しやすい。すなわち、利用者にとっては、例えば「目的地に行くは、〇〇レストランの隣を通り、エスカレータを上って、××レストランの方へ歩めばよい」等のようにルートを解釈する余地ができるから、より有効なルート誘導となる。さらに、目印設備を選ぶときブロック数を目安にしているため、目的地への接近に伴い徐々に小規模な設備が表示され始めることとなるから、利用者を正確に目的地に誘導できる。また、ルート表示欄11の画面に欠けが生じないため、空港ビルの地理に関し利用者に可能な限り多くの情報を提供することができる。さらに、表示候補補填の際に通過ページを優先的に補填に使用し既に踏破されたルートの少なくとも一部を併せて表示しているため、ルート表示がさらに見易くなり、使用性が高まる。

【0090】また、ステップ602にてルートが複数の階にまたがっていると判定された場合、ステップ604に代えステップ624～628が実行される。ステップ624では、ルートがまたがっている全ての階それぞれについて、ステップ604と同様にして表示候補群四角形が求められる。続くステップ626では、同一の階間移動装置(エレベータ、エスカレータ、階段等)がルート表示欄11上で同一列(同一行でも構わない)上に並ぶよう、各階について求められた表示候補群四角形同士が相互に位置決めされる。

【0091】例えば、第1のエスカレータを使用して1階から2階に上り、続いて第2のエスカレータを使用し

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て2階から3階に上るルートを考える。この場合、第1のエスカレータは、1階に係る表示候補群四角形の中にも、また2階に係る表示候補群四角形の中にも、含まれている。従って、画面の見易さを確保するためには、1階に係る表示候補群四角形の中の第1のエスカレータの位置と、2階に係る表示候補群四角形の中の第1のエスカレータの位置とを、ルート表示欄111上で位置揃えするのが好ましい。本実施形態では、ルート表示欄111上の縦位置を揃えるようにしている。なお、第2のエスカレータに関しても同様である。

【0092】続くステップ628では、図21(b)に示されるように、各階に係る表示候補群四角形が合成される。このようにすれば、ルートが複数回にまたがる場合でも、図20(b)に示されるように、図20(a)と同様の効果を得ることができる。加えて、利用者は、複数階にまたがるルートを常に一覧でき、かつ、直観的に把握できるから、複数の階を有する空港ビルにおいて利用者を効率的かつ確実に案内できる。

【0093】なお、ルート表示欄111上に表示する際には、各階表示候補群四角形の境界に太線等を付すのが好ましい。また、例えば1階から2階を経て1階に戻るようなルートを表示する際には、2階に上る前の部分ルートと、2階から降りた後の部分ルートを、単一の表示候補群四角形にて表示してもよいし、別の表示候補群四角形にて表示してもよい。

【0094】

【発明の効果】本発明の第1の構成によれば、複数の階を有する建物の屋内空間に複数の無線機を分散配置する一方で屋内空間を移動する利用者に無線機との無線通信の携帯端末を携帯させるようにしたため、屋外のインフラストラクチャを利用したりまた屋外に新たなインフラストラクチャを設ける必要がなく、屋内で比較的容易にルート案内を実施できる。また、本構成によれば、携帯端末との無線通信可能範囲が重複する無線機同士の無線周波数が互いに異なるよう、各無線機を配置するようにしたため、各携帯端末は、無線機位置情報同士の衝突なしに、常にいずれかの無線機から無線機位置情報を受信でき、従って屋内の利用者に対し常にルート情報を提供可能になる。さらに、受信した無線機位置情報に基づきルート情報を生成する際、その携帯端末が複数の無線機と無線通信可能な位置にあれば、当該複数の無線機からの無線機位置情報をいずれも利用できるから、現在地情報の精度・分解能は高く、従ってルート情報もより正確になる。また、本構成によれば、ルートの各階部分が含まれる各階地図を単一画面上に並べて可視表示するようにしたため、利用者が複数階にまたがるルートを常に一覧できると同時に、同一の階間移動装置(例えばエレベータ、エスカレータ、階段等)の行方向又は列方向の位置が揃うよう各階位置の表示位置を決めるようにしたため、利用者が表示画面から直観的に現在地、目的地、

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ルート等の相互関係を見て取ることができる。従って、複数の階を有する建物における利用者の案内を効率化及び確実化できる。

【0095】本発明の第2の構成によれば、目的地を階層的に入力する手段を設けたため、最少の入力操作にて目的地を設定可能になり、利用者を行きたいところへ迅速に案内可能になる。

【0096】本発明の第3の構成によれば、呼出し先情報の無線送信にて各携帯端末に呼出し先を設定したメッセージを送信しているため、必要に応じ利用者を所定の又は特定の場所へ呼び出したメッセージを伝達することが可能になる。

【0097】本発明の第4の構成によれば、各階毎に受信無線信号の多寡を判定し多数階からの無線機位置情報を現在地決定に利用しているため、例えば、利用者が階段脇に立ち止まったときや通り過ぎたとき等のように複数の階から同時に無線機位置情報を受信できるような状況でも、間違いなく利用者を案内できる。

【0098】本発明の第5の構成によれば、トイレ、レストラン、階間移動装置等、利用者が頻繁に利用するであろう設備又は利用者が利用する確率の高い設備に関する情報を、外部記憶媒体上にデータベース化し、これを地図情報として利用しているため、地図情報の情報量が少なく済み、従って携帯端末が小型簡素になる。

【0099】本発明の第6の構成によれば、携帯端末の現在地がルートから所定程度以上外れた場合にその旨を利用者に報知するようにしたため、案内されたルートを利用者が見失った場合でも利用者が自力でリカバリする機会を与えることができ、利用者を目的地までより確実かつ迅速に案内できる。また、本発明の第7の構成によれば、携帯端末の現在地がルートから所定程度以上外れた場合にルート情報を再度生成するようにしたため、案内されたルートを利用者が見失っておりかつその利用者が自力でリカバリできない場合でもリカバリ可能になり、利用者を目的地までより確実かつ迅速に案内できる。さらに、携帯端末の現在地がルートから所定程度以上外れたか否かの判定は、その時点で無線機から受信できる無線周波数や無線機位置情報が予測から外れたか否かの判定等により、格別の負荷なしに実現できる。

【0100】本発明の第8の構成によれば、ルートの全体が単一画面上に表示されかつ当該ルートが最大表示されるよう現在地の変化に応じ表示倍率を変化させるようにしたため、現在地の変化によらず常に見やすいルート表示を実現でき、これにより使用性を高めることができる。本発明の第9の構成によれば、さらに、ルート及びその周辺のエリアの地図を表示するのみでは画面の表示可能領域に対する実表示領域に不足が生じる場合に、既に踏破されたルートの少なくとも一部を含むエリアの地図を優先的に用いて表示を補填するようにしたため、さらに見やすいルート表示を実現でき、より使用性を高める

ことができる。

【0101】本発明の第10の構成によれば、携帯端末から無線機に現在地情報を無線送信し、この現在地情報をシステムにて収集するようにしたため、利用者の動向を簡便に管理・把握できる。本発明の第11の構成によれば、さらに、無線機からの返答要求信号に応じ携帯端末が現在地情報を無線送信するようにしたため、システムが随時利用者の動向を知ることができ、第3の構成に係る呼出し、メッセージ送信等をより好適に実行可能になる。

【0102】そして、本発明の第12の構成によれば、利用者の身体に当該携帯端末を着脱可能に固定するベルトを携帯端末に設けたため、利用者が携帯しやすい携帯端末を実現できる。

【0103】

【補遺】なお、本発明は次のような構成として把握することもできる。

【0104】(1) 本発明の第13の構成に係るルート案内方法は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、複数の階を有する建物の屋内空間に分散配置された複数の無線機から、それぞれ、その位置を示す無線機位置情報を無線送信するステップと、上記屋内空間を移動する利用者により携帯された上記携帯端末が上記無線機位置情報を無線受信するステップと、当該無線機位置情報を受信した携帯端末が当該無線機位置情報に基づき当該携帯端末の現在地を示す現在地情報を生成するステップと、当該現在地情報、目的地を示す目的地情報及び上記建物の屋内地図を示す地図情報に基づき、現在地から目的地に至るルートを示すルート情報を上記携帯端末が生成するステップと、上記ルートの各階部分が含まれる各階地図を、上記ルート情報に基づき、かつ、同一階間移動装置の行方向又は列方向の位置が揃うよう単一画面上に並べて、上記携帯端末が可視表示するステップと、を有し、複数階に亘る屋内空間にて上記携帯端末の利用者を目的地まで案内することを特徴とする。本構成によれば、第1の構成と同様の作用効果が得られる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0105】(2) 本発明の第14の構成に係る携帯端末は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、複数の階を有する建物の屋内空間に分散配置された複数の無線機から、その位置を示す無線機位置情報を無線受信する手段と、当該無線機位置情報に基づき当該携帯端末の現在地を示す現在地情報を生成する手段と、当該現在地情報、目的地を示す目的地情報及び上記建物の屋内地図を示す地図情報に基づき、現在地から目的地に至るルートを示すルート情報を生成する手段と、上記ルートの各階部分が含まれる各階地図を、上記ルート情報に基づき、

かつ、同一階間移動装置の行方向又は列方向の位置が揃うよう単一画面上に並べて、可視表示する手段と、を備え、複数階に亘る屋内空間にて上記携帯端末の利用者を目的地まで案内することを特徴とする。本構成によれば、第1又は第13の構成に適する携帯端末を提供できる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0106】(3) 本発明の第15の構成に係る利用者動向管理方法は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、屋内空間に分散配置された複数の無線機により、当該屋内空間を移動する利用者により携帯される上記携帯端末から、その携帯端末の現在地に関する現在地情報を無線受信するステップと、上記無線機により無線受信された上記現在地情報を収集することにより管理コンピュータが上記利用者の動向を管理するステップと、を有することを特徴とする。本構成によれば、利用者の動向を常に又は定期的に把握することができる。特に、管理コンピュータ又はその下位にある中間コントローラの制御の下に無線機から返答要求信号を無線送信し、これの無線受信に応じて携帯端末が現在地情報を無線送信するようにすれば、システムが随時利用者の動向を知ることができ、第3の構成に係る呼出し、メッセージ送信等をより好適に実行可能になる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0107】(4) 本発明の第16の構成に係る目的地設定方法は、目的地の候補の分類を可視表示する第1ステップと、可操作部材の操作により利用者がいずれかの分類を選択する第2ステップと、選択された分類に属する目的地の候補をさらに分類して第1及び第2ステップを実行する第3ステップと、利用者による可操作部材の操作に応じ第1乃至第3ステップの実行を終了させる第4ステップと、第4ステップの実行後、それまでに選択された階層的な分類に従い目的地を決定する第5ステップと、を有し、屋内空間を移動する上記利用者により携帯された携帯端末において実行されることを特徴とする。本構成によれば、目的地を階層的に入力できるため、最少の入力操作にて目的地を設定でき、利用者を行きたいところへ迅速に案内可能になる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0108】(5) 本発明の第17の構成に係る利用者呼出し方法は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、屋内空間に分散配置された複数の無線機から、上記屋内空間を移動する利用者により携帯される上記携帯端末に対し、その携帯端末の利用者の呼出し先を示す呼出し先情報を無線送信するステップと、上記無線機から上記呼出し先情報を無線受信した携帯端末が、その携帯端末の現在地を示す現在地情報、上記呼出し先情報及び上記建

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物の屋内地図を示す地図情報に基づき、目的地から呼び出し先に至るルートを示すルート情報を生成するステップと、生成したルート情報を利用者に提供するステップと、を有することを特徴とする。本構成によれば、呼出し先情報の無線送信にて各携帯端末に目的地（呼出し先）を設定しているため、必要に応じ利用者を所定の又は特定の場所へ呼び出すことが可能になる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0109】（6）本発明の第18の構成に係るメッセージ送信方法は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、屋内空間に分散配置された複数の無線機から、上記屋内空間を移動する利用者により携帯される上記携帯端末に対し、その携帯端末の利用者に伝達すべきメッセージを示すメッセージ情報を無線送信するステップと、上記無線機から上記メッセージ情報を無線受信した携帯端末が、当該メッセージ情報に基づき上記メッセージを可視表示するステップと、を有することを特徴とする。本構成によれば、利用者に対し無線機側から随時メッセージを伝達可能になる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0110】（7）本発明の第19の構成に係る現在地決定方法は、携帯端末との無線通信可能範囲が互いに重複する無線機同士の無線周波数が互いに異なるよう、複数の階を有する建物の屋内空間に分散配置された複数の無線機から、その位置を示す無線機位置情報を無線送信するステップと、上記屋内空間を移動する利用者により携帯された上記携帯端末が上記無線機位置情報を無線受信するステップと、当該無線機位置情報を無線受信した携帯端末が、相異なる階に配置されている複数の無線機からそれぞれ無線機位置情報を無線受信した場合に、当該無線機位置情報を無線送信した無線機の各階毎個数を判定するステップと、当該個数が他の階に比べ多い階に配置されている無線機からの無線機位置情報に基づき携帯端末がその現在地を示す現在地情報を生成するステップと、生成した現在地情報又はこれに基づき生成されるルート情報を利用者に提供するステップと、を有することを特徴とする。本構成によれば、各階毎に受信無線信号の多寡を判定し多数階からの無線機位置情報を現在地決定に利用しているため、例えば、利用者が階段脇に立ち止まったときや通り過ぎたとき等のように複数の階から同時に無線機位置情報を受信できるような状況でも、間違いなく利用者を案内できる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0111】（8）本発明の第20の構成に係るルート外れリカバリ方法は、屋内空間を移動する利用者により携帯される携帯端末の現在地が、予め設定されているルートから所定程度以上外れた場合に、ルートから外れた旨を当該携帯端末の利用者に報知するステップと、利用者か

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らの指示に応じ、その時点での現在地から目的地にいたるルートを示すルート情報を作成し利用者に提供するステップと、を有することを特徴とする。本構成によれば、携帯端末の利用者がルートを見失った場合でもその利用者が自力でリカバリする機会を与えることができ、利用者を目的地までより確実かつ迅速に案内できる。さらに、利用者の求めに応じルート情報を改めて生成するようにしたため、その利用者が自力でリカバリできない場合でもリカバリ可能になり、利用者を目的地までより確実かつ迅速に案内できる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0112】（9）本発明の第21の構成に係るルート表示方法は、携帯端末の現在地を示す現在地情報、目的地を示す目的地情報及び当該携帯端末の利用者が移動する屋内空間の地図を示す地図情報に基づき、現在地から目的地に至るルートを示すルート情報を生成するステップと、上記ルートの各階部分が含まれる各階地図を、上記ルート情報に基づき可視表示するステップと、上記ルートの全体が単一画面上に表示されかつ当該ルートが最大表示されるよう、その現在地の変化に応じ表示倍率を変化させるステップと、ルート及びその周辺のエリアを含む地図を表示させたのみでは画面上の表示可能領域に対する実表示領域の不足が生じる場合に、隣接するエリアの地図にて表示を補填するステップと、補填の際、既に踏破されたルートの少なくとも一部を含むエリアの地図を優先的に使用するステップと、を有し、複数の階を有する建物の屋内空間を移動する利用者により携帯された上記携帯端末において実行されることを特徴とする。本構成によれば、ルートの全体が単一画面上に表示されかつ当該ルートが最大表示されるよう現在地の変化に応じ表示倍率を変化させるようにしたため、現在地の変化によらず常に見易いルート表示を実現でき、これにより使用性を高めることができる。さらに、現在地の変化に応じ表示倍率を変化させると表示画面に余剰が生じる場合に、既に踏破されたルートの少なくとも一部を併せて可視表示させるようにしたため、さらに見易いルート表示を実現でき、より使用性を高めることができる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【0113】（10）本発明の第22の構成に係る携帯端末は、屋内に設けられているトイレ、レストラン、階間移動装置等の設備の位置を示す情報を地図情報として格納する外部記憶手段と、当該携帯端末の現在地を示す現在地情報、目的地を示す目的地情報及び外部記憶手段上の地図情報に基づき、現在地から目的地に至るルートを示すルート情報を可視表示する表示器と、その携帯端末の利用者の身体に当該携帯端末を着脱可能に固定するベルトと、を備えることを特徴とする。本構成によれば、利用者が頻繁に利用するであろう設備又は利用者が利用する確率の高い設備に関する情報を、外部記憶媒体

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上にデータベース化し、これを地図情報として利用しているため、地図情報の情報量が少なく済み、従って携帯端末が小型簡素になり、携帯に便利になる。その結果、ベルトにて利用者の身体に装着することも可能になる。また、本発明の他の構成を参照して本構成に変形を施すことも可能である。

【図面の簡単な説明】

【図1】 本発明の一実施形態に係る空港ビル内ルート案内システムのブロック図である。

【図2】 携帯端末の外観の一例を示す図である。

【図3】 無線機や携帯端末の位置を示すためのアドレスの構造を示す図であり、特に(a)は空港ビルの階構成を、(b)は各階におけるページ配置を、(c)は各ページにおけるアドレス配置並びに無線機の配置、電波範囲及び無線周波数割当てを、それぞれ示す図である。

【図4】 ICカード上にあるカードデータの構造を示す図であり、特に(a)はトイレに関するデータの構造を、(b)はレストランに関するデータの構造を、(c)は階間移動装置に関するデータの構造を、それぞれ示す図である。

【図5】 無線インタフェースを示す図であり、特に(a)は無線機送信フレームの構成を、(b)は携帯端末送信フレームの構成を、それぞれ示す図である。

【図6】 管理コンピュータ、中間コントローラ、無線機及び携帯端末の間で実行される通信の概略手順を示す図であり、特に中間コントローラによる定時一斉同報の手順を示す図である。

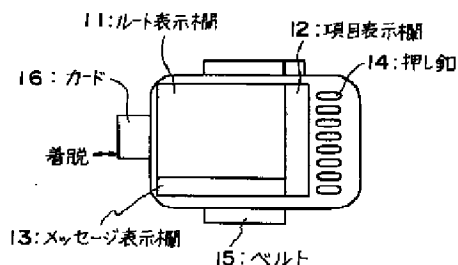
【図7】 管理コンピュータ、中間コントローラ、無線機及び携帯端末の間で実行される通信の概略手順を示す図であり、特に管理コンピュータによるメッセージ送信や呼出しの手順を示す図である。

【図8】 管理コンピュータにより取り扱われる情報を示す図であり、特に(a)はフライト情報の構造を、(b)は旅客情報の構造を、それぞれ示す図である。

【図9】 携帯端末により実行される無線機送信フレームへの応答手順を示すフローチャートである。

【図2】

携帯端末の構成



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【図10】 メッセージ表示画面の一例を示す図である。

【図11】 携帯端末により実行される現在地判定手順を示すフローチャートである。

【図12】 携帯端末により実行されるルート決定手順を示すフローチャートである。

【図13】 誘導表示画面の一例を示す図である。

【図14】 誘導有無選択画面の一例を示す図である。

【図15】 目的地入力操作の一例を示す図である。

10 【図16】 携帯端末により実行されるルート外れリカバリ手順を示すフローチャートである。

【図17】 ルート外れ表示画面の一例を示す図である。

【図18】 携帯端末により実行される現在地・目的地・ルート表示手順を示すフローチャートである。

20 【図19】 ルートが複数の階にまたがっていないときのルート表示方法を示す図であり、特に(a)は表示候補を補填する必要がない例を、(b)は踏破済みのルートに係るページのみで補填できる例を、(c)はそれ以外のページのみで補填する例を、(d)は双方で補填する例を、それぞれ示す図である。

【図20】 現在地変化に伴う表示倍率自動変更動作を示す図であり、特に(a)はルートが複数の階にまたがっていない場合を、(b)はルートが複数の階にまたがっている場合を、それぞれ示す図である。

【図21】 エスカレータ等の階間移動装置の縦位置を揃える処理を示す図であり、特に(a)は位置揃えを、(b)は表示候補群四角形の合成を、それぞれ示す図である。

30 【符号の説明】

10 携帯端末、11 ルート表示欄、12 項目表示欄、13 メッセージ表示欄、14 押し釦、15 ベルト、16 ICカード、20 無線機、30 中間コントローラ、40 管理コンピュータ、50 フライトシステム、F1, F2, ... Fm 無線周波数。

【図5】

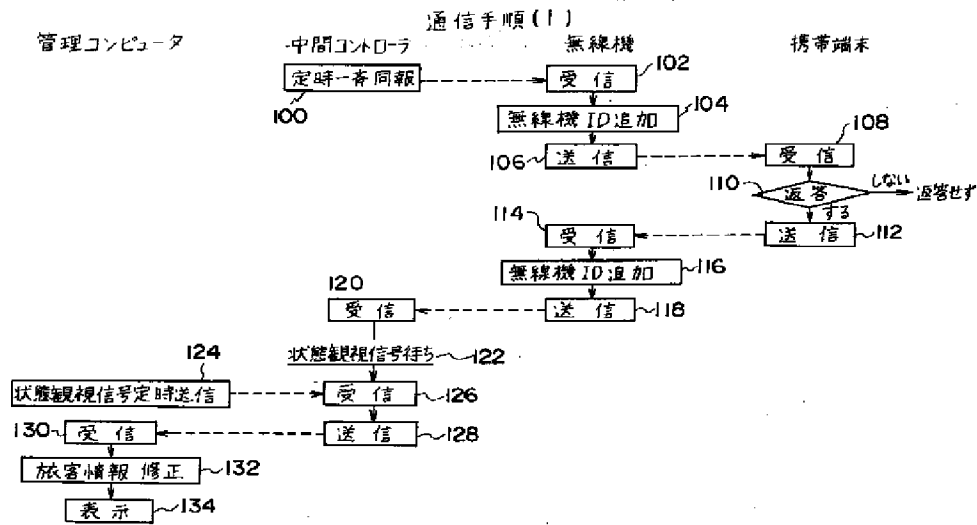
(a) 無線機から携帯端末に送信するフレーム

無線機 ID	メッセージ 有無フラグ	呼出し先 アドレス	携帯端末 ID	メッセージ	返答要求 有無フラグ
-----------	----------------	--------------	------------	-------	---------------

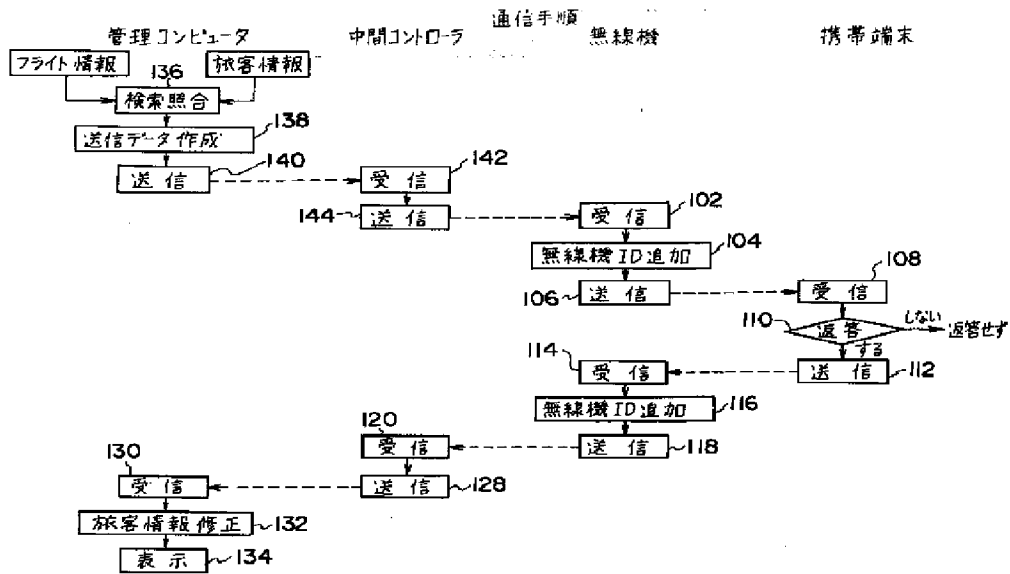
(b) 携帯端末から無線機に送信するフレーム

携帯端末 ID	確認 有無フラグ	現在地 アドレス
------------	-------------	-------------

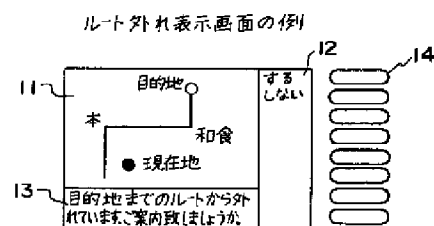
【図6】



【図7】



【図17】



【図8】

管理コンピュータが扱う情報

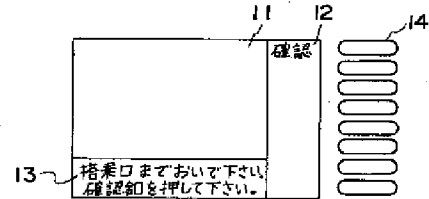
便名	発着時刻	情報
XX123	00:00	
00456	0X:0X	キャンセル
0X789	XX:XX	

(a)フライト情報

端末ID	氏名	搭乗便	現在地アドレス
XXXXXXXX	XXXX	XXXXX	XXXXXXXX
:	:	:	:
:	:	:	:
:	:	:	:

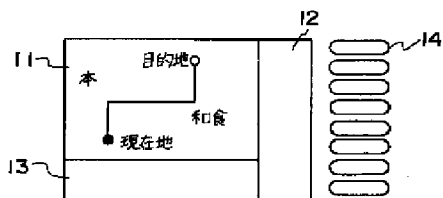
(b)旅客情報

【図10】

メッセージ表示画面の例
(呼出しメッセージの例)

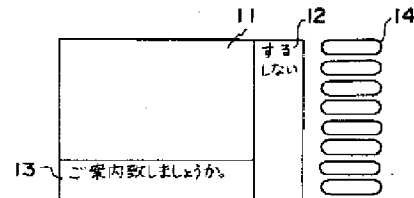
【図13】

誘導表示画面の例



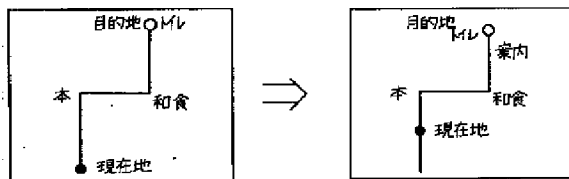
【図14】

誘導有無選択画面の例

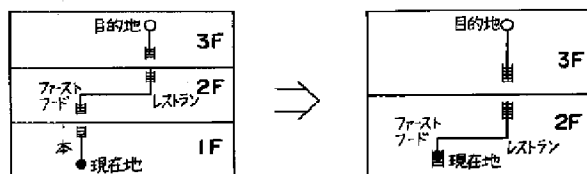


【図20】

現在地変化に伴う表示倍率自動変更



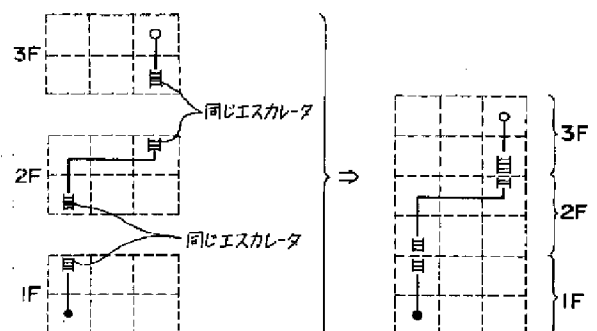
(a) ルートが複数の階にまたがっていないとき



(b) ルートが複数の階にまたがっているとき

【図21】

エスカレータの縦位置をそろえる処理



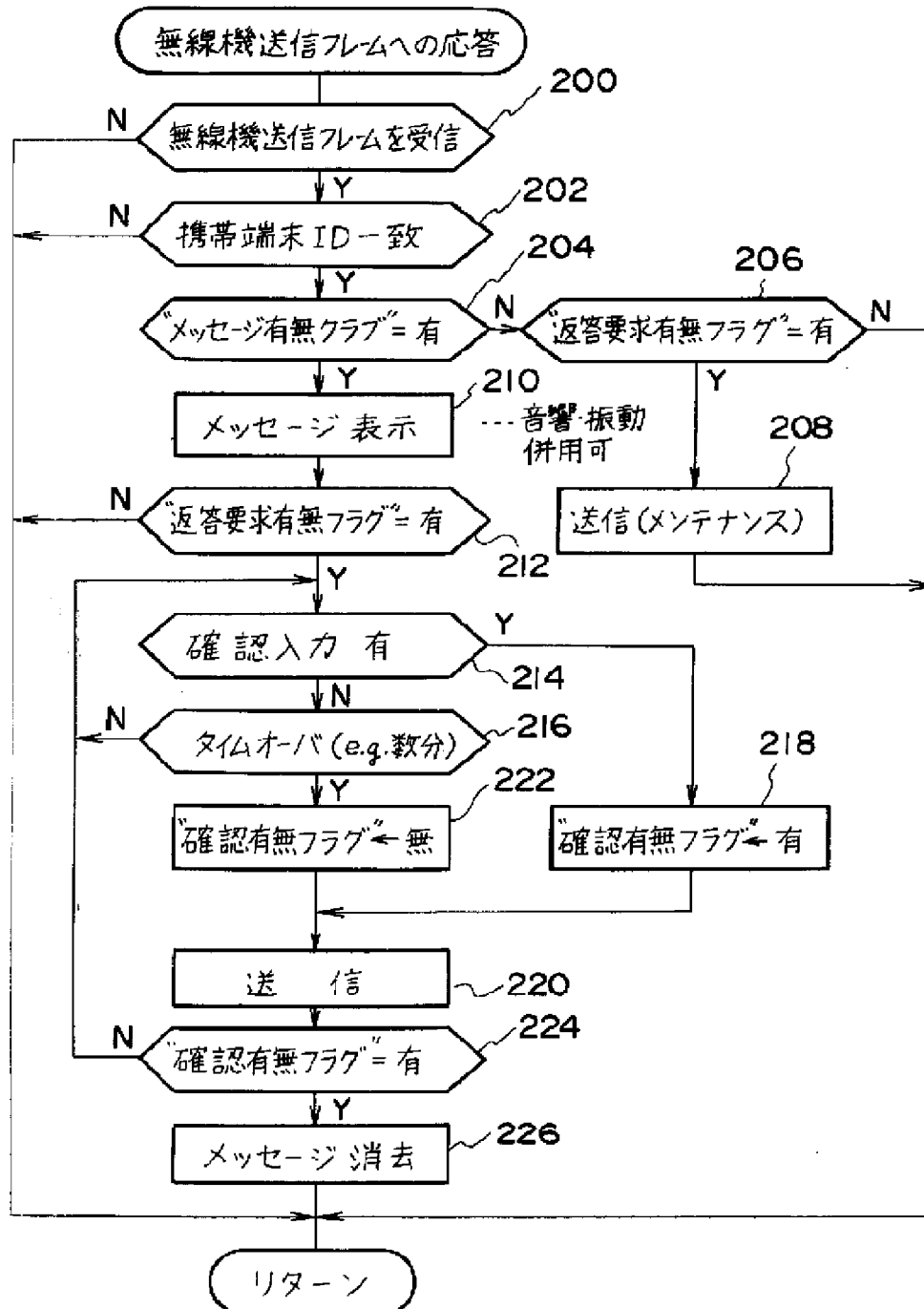
(a)

(b)

□ ページ
● 現在地
○ 目的地
— ルート
目 エスカレータ

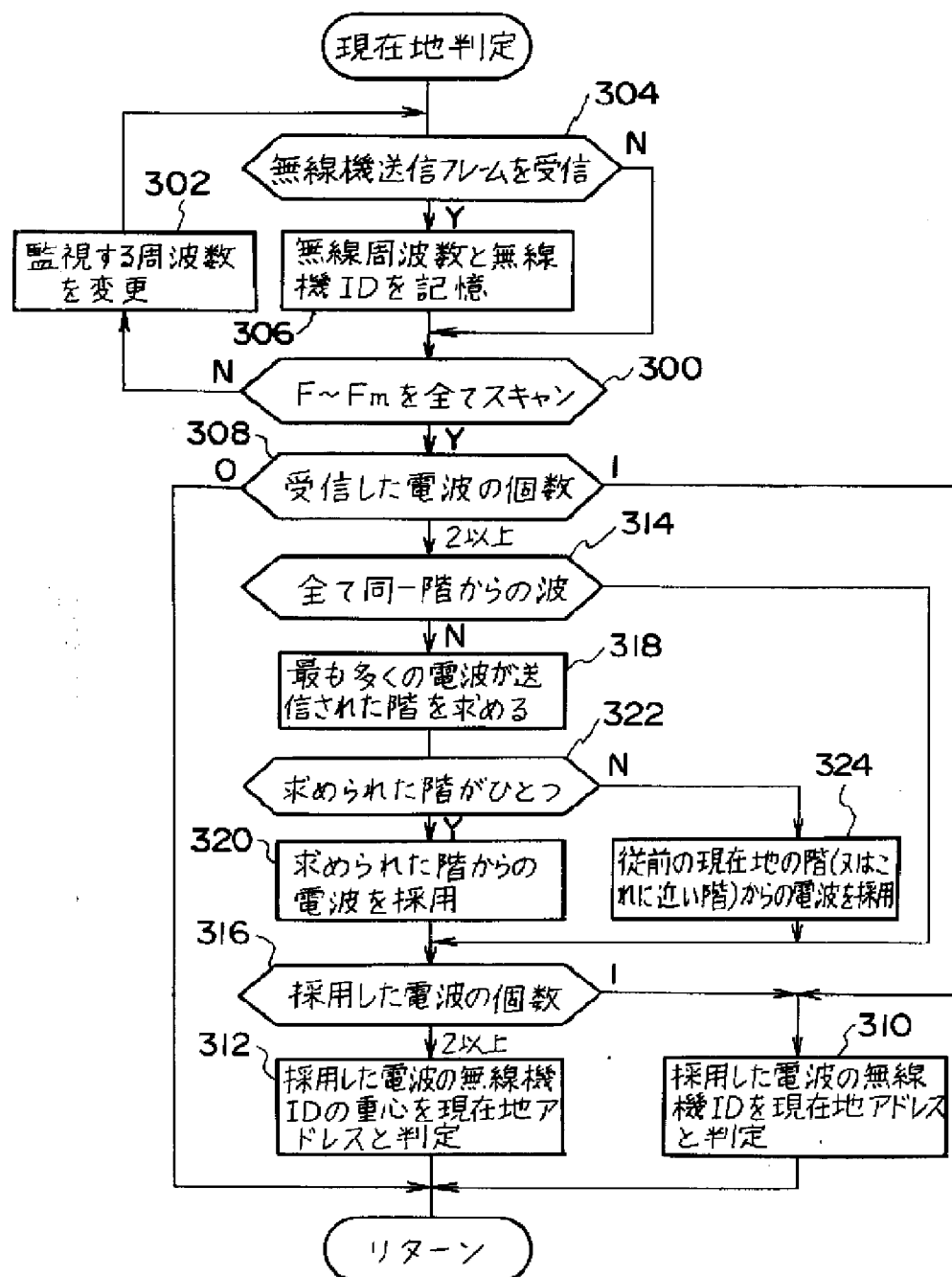
【図9】

携帯端末の動作(1)



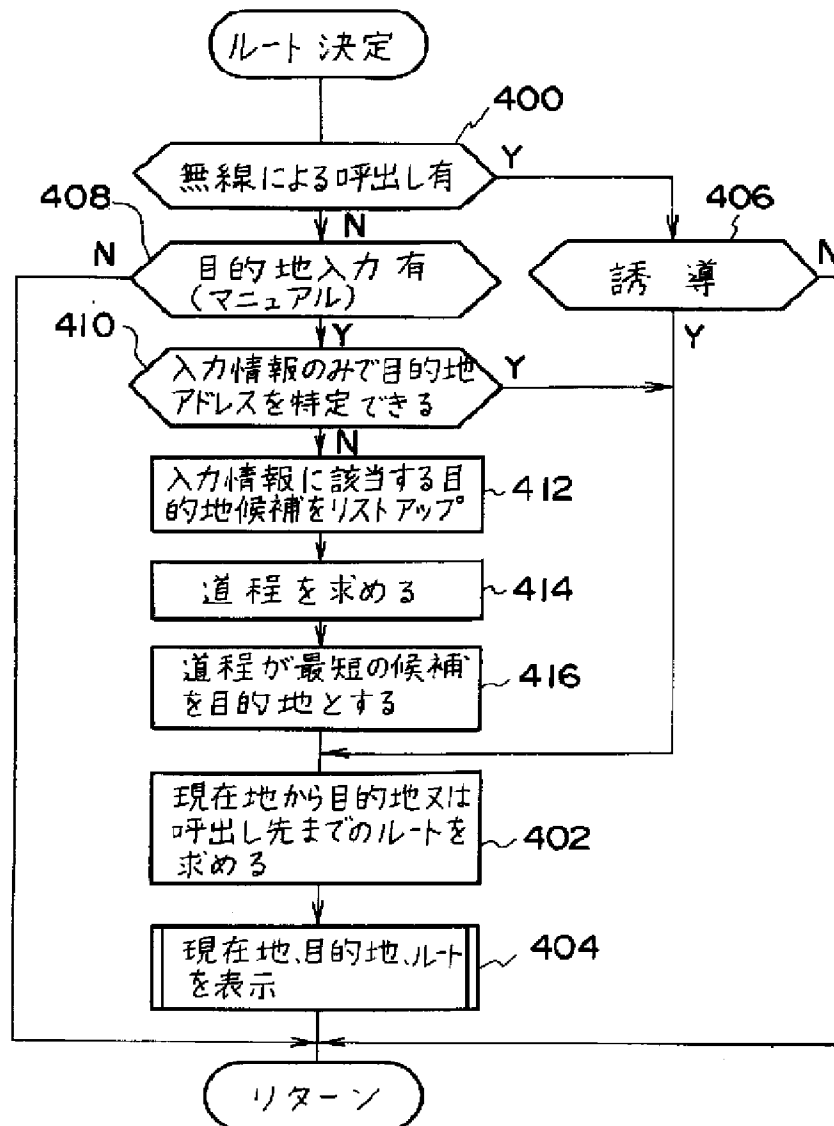
【図11】

携帯端末の動作(2)

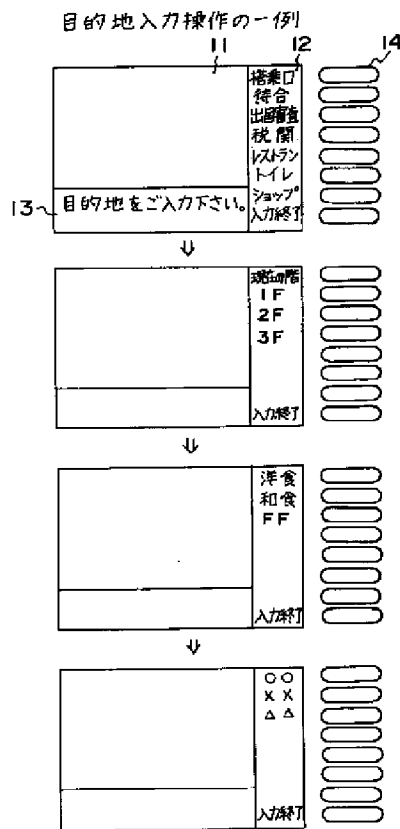


【図12】

携帯端末の動作(3)

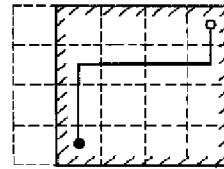


【図15】

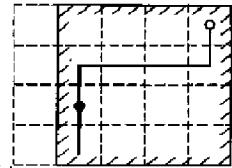


【図19】

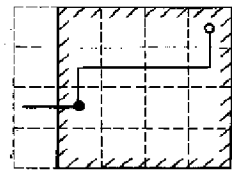
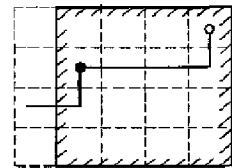
ルートが複数の階にまたがっていないときのルート表示



(a) 補う必要がない例

ルートに従うと
縦く横になるそこで従前のルートの
ページも加える

(b) 従前ルートを補う例

ルートに従うと
縦く横になる不足辺にページ
を足す(c) 不足辺にページを
補う例ルートに従うと
縦く横になるそこで従前のルートの
ページも加える不足辺にページを
足す

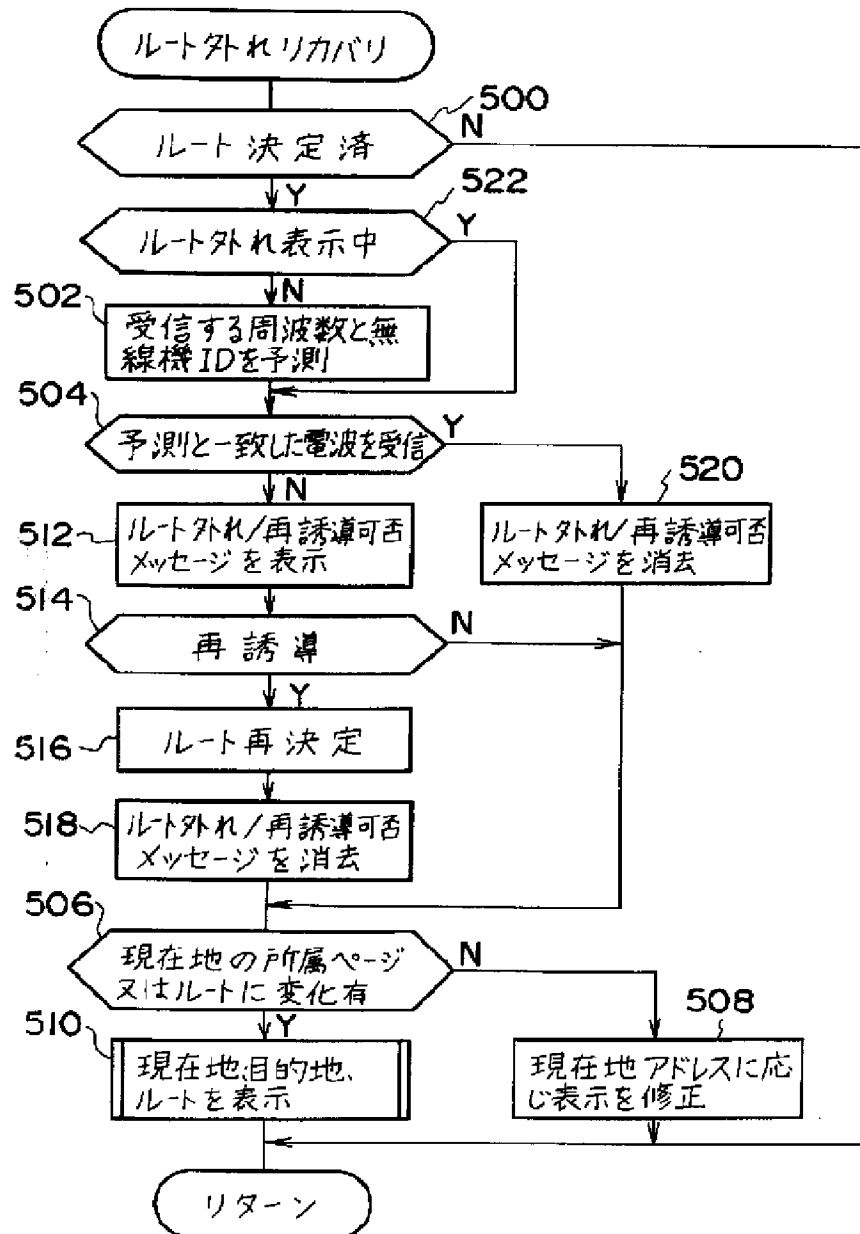
(d) (b)と(c)の組合せ

● 現在地
○ 目的地
— ルート

■ 表示されるページ群
□ ページ

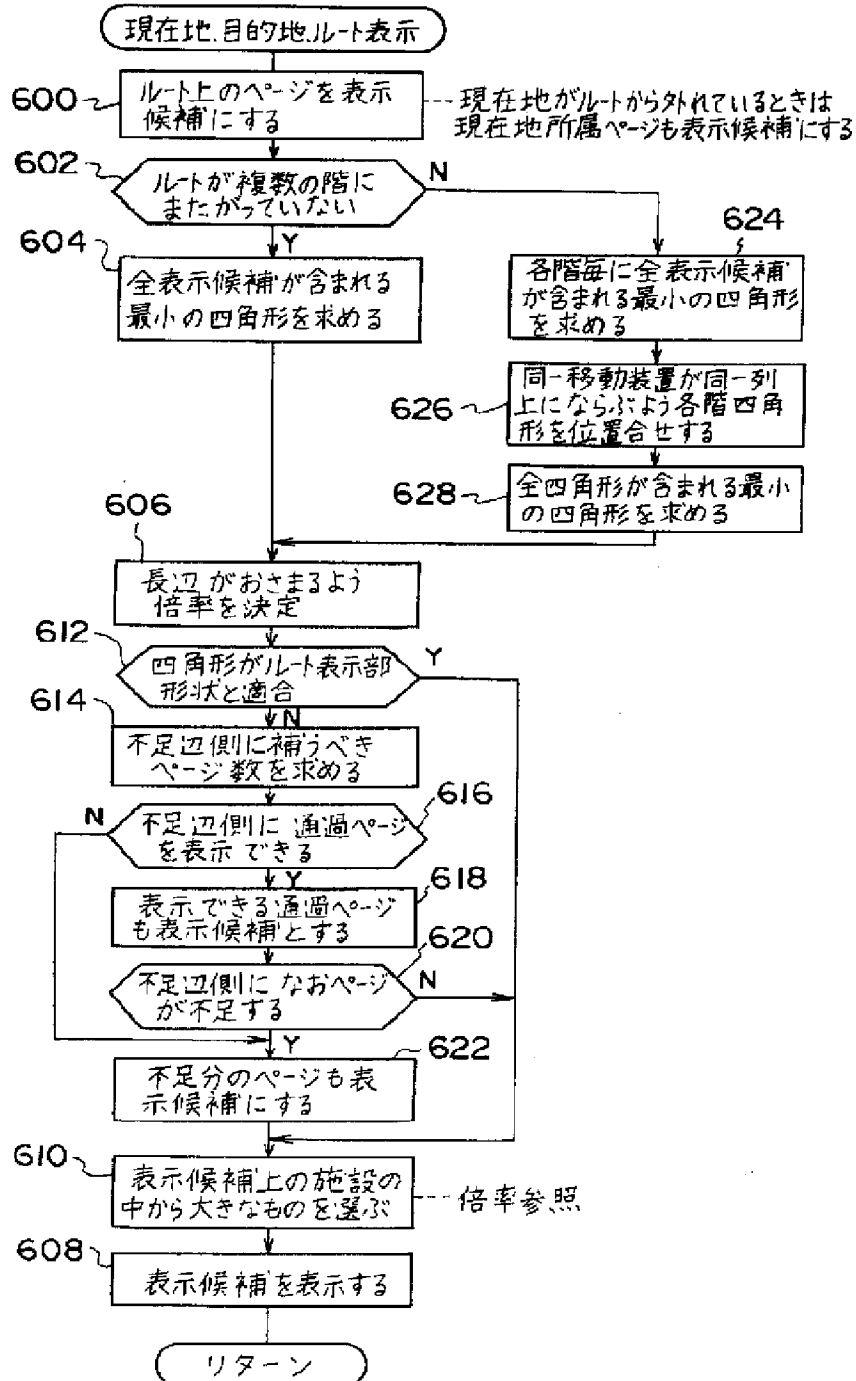
【図16】

携帯端末の動作(4)



【図18】

携帯装置の動作(5)



DERWENT- 1997-323525
ACC-NO:
DERWENT- 199730
WEEK:

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TITLE: Route guidance system to guide user inside buildings uses portable terminal which receives wireless transmission of radios distributed in buildings to determine then current position and path

INVENTOR: YAMAZAKI M

PATENT-ASSIGNEE: TOYOTA JIDOSHA KK[TOYT]

PRIORITY-DATA: 1995JP-287601 (November 6, 1995)

PATENT-FAMILY:		
PUB-NO	PUB-DATE	LANGUAGE
JP 09126804 A	May 16, 1997	JA

APPLICATION-DATA:			
PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 09126804A	N/A	1995JP-287601	November 6, 1995

INT-CL-CURRENT:	
TYPE	IPC DATE
CIPP	G09B29/10 20060101
CIPS	G01C21/00 20060101
CIPS	G01S5/02 20060101
CIPS	G06Q30/00 20060101
CIPS	G06Q50/00 20060101
CIPS	G08G1/0969 20060101

ABSTRACTED-PUB-NO: JP 09126804 A

BASIC-ABSTRACT:

The system consists of radio distributed inside building and portable terminal carried by guide user. Each radio transmits its current position at its own frequency. User terminal receives this information based on which the current position of user and route to destination are displayed on indoor map. Each portable terminal will receive radio position information without collision of informations from other radios and hence route information is continuously provided to user. It in turn makes the reaching of the destination easier without fear of moving in a wrong path.

ADVANTAGE - User of portable terminal which can extend to extent is of greater importance. Is excellent form to collect information at exact position.

CHOSEN- Dwg.1/1
DRAWING:

TITLE- ROUTE GUIDE SYSTEM USER BUILD PORTABLE TERMINAL
TERMS: RECEIVE WIRELESS TRANSMISSION RADIO DISTRIBUTE
DETERMINE CURRENT POSITION PATH

DERWENT-CLASS: P85 S02 W06

EPI-CODES: S02-B08A; W06-A02A; W06-A03;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: 1997-267669

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.

**NONPUBLICATION REQUEST
UNDER
35 U.S.C. 122(b)(2)(B)(i)**

First Named Inventor

Ehud MENDELSON

Title

VEHICLE BEACON AND METHOD OF USE

Attorney Docket Number

MEN-17-002

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).



Signature

January 10, 2017

Date

Allen D. Hertz

50,942

Typed or printed name

Registration Number, if applicable

561-716-3915

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). 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 6 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 (1-800-786-9199) and select option 2.

VEHICLE BEACON AND METHOD OF USE

CROSS REFERNECE TO RELATED APPLICATIONS

[0001] This application is:

A) is a Divisional Application of U.S. Patent Application Ser. No. 15/397,685 filed on January 03, 2017,

which is a Divisional Application of U.S. Patent Application Ser. No. 15/237,727 filed on August 16, 2016 (now US Patent 9,420,423 on January 03, 2017),

which is a Divisional Application of U.S. Patent Application Ser. No. 15/086,028 filed on March 30, 2016 (now US Patent 9,420,423 on August 16, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,406 filed on May 22, 2014 (currently pending),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,332 filed on May 22, 2014 (now US Patent 9,491,584 on November 08, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,273 filed on May 22, 2014, (now US Patent 9,204,257 on December 01, 2015),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,209 filed on May 22, 2014, (now US Patent 9,204,251 on December 01, 2015),

which is a Divisional Application of U.S. Patent Application Ser. No. 12/930,735 filed on January 14, 2011 (now US Patent 9,020,687 on April 28, 2015),

which is a Divisional Application of U.S. Patent Application Ser. No. 11/396,843 filed on April 03, 2006 (now US Patent 7,899,583 on March 01, 2011),

which is a Non-Provisional U.S. Patent Application claiming the benefit of U.S. Provisional Patent Application Ser. No. 60/670,097 filed on April 12, 2005 (now expired);

B) is a Divisional Application of U.S. Patent Application Ser. No. 15/397,685 filed on January 03, 2017,

which is a Divisional Application of U.S. Patent Application Ser. No. 15/237,727 filed on August 16, 2016 (now US Patent 9,420,423 on January 03, 2017),

which is a Divisional Application of U.S. Patent Application Ser. No. 15/086,028 filed on March 30, 2016 (Scheduled to issue as US Patent 9,420,423 on August 16, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,406 filed on May 22, 2014 (currently pending),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,332 filed on May 22, 2014 (now US Patent 9,491,584 on November 08, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,273 filed on May 22, 2014, (now US Patent 9,204,257 on December 01, 2015),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,209 filed on May 22, 2014, (now US Patent 9,204,251 on December 01, 2015),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 13/135,421 filed on July 05, 2011 (now US Patent 9,374,673 on June 21, 2016),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 12/932,811 filed on March 07, 2011 (now US Patent 8,941,485 on January 27, 2015),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 12/069,899 filed on February 13, 2008 (issued as US Patent 7,924,149 on April 12, 2011),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 11/472,706 filed on June 22, 2006 (now US Patent 8,896,485 on November 25, 2014),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 11/429,864 filed on May 08, 2006 (now US Patent 8,836,580 on September 16, 2014),

which is a Non-Provisional U.S. Patent Application claiming the benefit of U.S. Provisional Patent Application Ser. No. 60/678,947 filed on May 09, 2005 (now expired), and

C) is a Divisional Application of U.S. Patent Application Ser. No. 15/397,685 filed on January 03, 2017,

which is a Divisional Application of U.S. Patent Application Ser. No. 15/237,727 filed on August 16, 2016 (now US Patent 9,420,423 on January 03, 2017),

which is a Divisional Application of U.S. Patent Application Ser. No. 15/086,028 filed on March 30, 2016 (Scheduled to issue as US Patent 9,420,423 on August 16, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,406 filed on May 22, 2014 (currently pending),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,332 filed on May 22, 2014 (now US Patent 9,491,584 on November 08, 2016),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,273 filed on May 22, 2014, (now US Patent 9,204,257 on December 01, 2015),

which is a Divisional Application of U.S. Patent Application Ser. No. 14/285,209 filed on May 22, 2014, (now US Patent 9,204,251 on December 01, 2015),

a Divisional Application of pending U.S. Patent Application Ser. No. 12/587,042 filed on October 01, 2009 (now US Patent 8,866,876 on October 21, 2014),

which is a Divisional Application of pending U.S. Patent Application Ser. No. 11/429,864 filed on May 08, 2006 (now US Patent 8,836,580 on September 16, 2014),

which is a Non-Provisional U.S. Patent Application claiming the benefit of U.S. Provisional Patent Application Ser. No. 60/678,947 filed on May 09, 2005 (now expired).

FIELD OF THE INVENTION

[0002] This invention is directed generally to the field of a beacon system for use in a building, such as a commercial or a residential application. More specifically, the application of on or more mobile Bluetooth transceivers enabled to support Location Based Service (LBS) applications.

BACKGROUND OF THE INVENTION

[0003] Introduction to Location Based Services (LBS):

[0004] Location Based Services (LBS) are rapidly expanding. Outdoor location technologies are mainly based on Global Positioning System (GPS) technologies. The Global Positioning System (GPS) cannot perform properly indoors and is therefore inadequate. As a result, indoor location systems are appearing on the market.

[0005] The need for a system arises from various market segments and applications. One example in the market is the Global Positioning System (GPS) based systems that use integrated positioning and navigation systems based on Global Positioning System (GPS) receivers as the primary positioning technology. Subsequent to the events of September 11th the Federal government mandated that Global Positioning System (GPS) capability be built in to all cellular phones. However, the fact that uninterrupted satellite reception is not possible in many locations is a major limitation of Global Positioning System (GPS) based systems. Densely populated areas and radio-frequency-signal shadowed locations, such as urban centers (alternatively referred to as "urban canyons"), generally do not allow proper operation of Global Positioning System (GPS), yet it is in these locations that the need is greatest.

[0006] There is a clear need for a cost effective system that maintains performance indoors, in urban canyons and in city centers.

[0007] Another important consideration is that the Global Positioning System (GPS) is susceptible to jamming and other man-made interference.

[0008] Description of a Global Positioning System (GPS):

[0009] The Global Positioning System (GPS) is a satellite based navigation and time identification system developed by the U.S. Department of Defense. The Global Positioning System (GPS) originally served marine, airborne and terrestrial users in the military and has been later adapted to serve civilians as well. Specifically, Global Positioning System (GPS) includes the Standard Positioning Service (SPS) that provides civilian users with 100 meter accuracy as to the location or position of the user. For military users Global Positioning System (GPS) provides the Precise Positioning Service that is accurate to within 20 meters. Both of these services are available worldwide with no requirement for any local equipment.

[0010] View of Global Positioning System (GPS) limitations:

[0011] A first limitation of the Global Positioning System (GPS) is that, upon activation, the Global Positioning System (GPS) receiver scans for signals from the constellation of Global Positioning System (GPS) satellites. A unit must locate and receive signals from at least four (4) satellites in order to be able to determine its location. This process of locating the minimum number of satellites, receiving the data and achieving a position fix can take several minutes. This delay is problematic for many Global Positioning System (GPS) applications.

[0012] A second limitation of the Global Positioning System (GPS) is that the receiver needs a clear view of the sky to successfully receive signals from the constellation of associated satellites. Again, under unfriendly signal receiving conditions, such as inside buildings, in "urban canyons", in the shadows of high buildings, and the like, the Global Positioning System (GPS) suffers from multi-path effects and therefore shows poor performance, or, worse, none at all.

[0013] A third limitation of the Global Positioning System (GPS) is limited accuracy. The civilian version of the Global Positioning System (GPS) signal includes limited accuracy by design. While knowing a position of an individual to within an accuracy of 50 to 200 feet anywhere on the planet is a major technological feat. This accuracy may not be sufficient to provide a location and/or navigation to a user in a store, a mall, to a vacant or available parking

space (each space measures about 10 feet), and the like. The use of the Global Positioning System (GPS) is further limited in an indoor environment, such as most indoor stores and/or malls, as the Global Positioning System (GPS) cannot work effectively when the receiver is located in doors or a line of sight to the satellites is blocked by a roof or other object.

[0014] Existing navigation systems, such as the new mandatory Global Positioning System (GPS) equipped cellular telephones, are based on the Global Positioning System (GPS) and have the aforementioned limitations.

[0015] Another significant factor adding to the limitations of the Global Positioning System (GPS) based systems is the important role of map production. In an optimal scenario, a user would want a map to be as detailed and as up-to-date as possible. The existing maps used by the Global Positioning System (GPS) based applications provide limited detail and are not able to reflect changes on a real time basis. More importantly, mapping for indoor facilities is essentially not readily available to the general public or integrated into Global Positioning System (GPS) based applications. The recent introduction of imagery services, such as **GOOGLE EARTH** and its competitors are offered as an enhancement to Global Positioning System (GPS). Even with these, they are still present outdated information. The consequences of limited and outdated mapping are unsatisfactory results, wherein users encounter road changes, and area development changes that not shown on the maps and imagery.

[0016] The Proposed Solutions:

[0017] In general, the subject invention is based on applying machine-learning techniques to the task of inferring aspects of the user's status from a stream of input from small RF tags or beacons, which are installed in a local area, including indoor and/or outdoor locations or in places designated as Point Of Interest (POI). Examples of areas of deployment of the RF tags or beacons can include a mall, a department store, adjacent to a product inside a store, within a street parking or garage parking area, and the like. In a broad sense, the RF tags or beacons can be located indoors, outdoors, in a public location, in a commercial location, and the like. The RF tags or beacons can employ Radio Frequency IDentification (RFID) (long range type) technology, Bluetooth with the option to long range Bluetooth technology, Wi-Fi technology, or any other suitable RF technology. The RF tags or beacons are adapted to broadcast a unique

identification (ID) using any suitable wireless broadcasting technology that includes an identification portion in a unidirectional pulsing signal. The identification portion in a unidirectional pulsing signal identifies a location of the RF tag or beacon by including a unique identification (ID), such as the address or location and type of facility, store, product, and the like. The RF tag or beacon broadcasts location identification and any other desired information in the identification portion in a unidirectional pulsing signal to be picked up by a compatible receiver integrated into the mobile telephone. An association application would decode the received identification portion in a unidirectional pulsing signal and act accordingly.

[0018] The application is adapted for indoor guide navigation and Location Based Services (LBS), or navigation in crowded urban areas, where Global Positioning System (GPS) based systems, due to lack of access to satellites or the Global Positioning System (GPS) limitations detailed previously, cannot achieve the required results.

[0019] The disclosed applications focus on the task of interactively guiding the user to a desired indoor destination.

[0020] Examples of indoor applications:

[0021] The user may wish to locate a vacant or available parking space in his/her vicinity, wherein the parking spaces can be located outdoors or within a covered parking area, such as a parking garage.

[0022] The user may wish to locate a specific store within a shopping mall, a particular aisle in a department store, or even as detailed as a specific item on a shelf.

[0023] The user may wish to locate a specific conference room in a convention center, a Point Of Interest (POI) in an amusement park, a Point Of Interest (POI) in a museum, and the like.

[0024] The user may be looking for a train location in a train station, train stops associated with a subway, or train stops associated with any other underground train system.

PRIOR ART

[0025] At present, however, no prior art device utilizes the capabilities to display a real-time representation of navigating directly from the sensors without a central system; and without using a Global Positioning System (GPS) based system directly to the user. Most systems are designed for an antiquated query type search, where interface to an Internet and/or a database to a central system is needed.

[0026] The navigation system automatically detects a beacon signal transmitted directly from the RF beacon. The process does not require any bi-directional communication, such as cellular communication, to determine the location of the mobile device. Contrarily, other systems require bi-directional communication and must have bandwidth available, over which to send a request to a central system, or to a database, and then must wait for a response. This requires an operational, bi-directional communication infrastructure and, additionally, takes time.

[0027] Even if the other systems have bandwidth available, the other systems are still based on the existing search concept where the user submits a query, searches and waits for the response. This is impractical. The subject system provides the information automatically, without submitting any query, and the response is according to the user's location, wherein the user's location is determined by proximity to the beacon in the local area.

[0028] Again, most of the existing prior arts are based either on a Global Positioning System (GPS) based system or an integrated, in-car navigation system employing the Global Positioning System (GPS). The existing mapping employed by these systems includes the same limitations described previously and is impractical.

[0029] The present invention bridges the gap between the Global Positioning System (GPS) based navigation by providing an improved and complete solution.

[0030] United States Patent No. 7,031,875, issued to Ellenby et al. describes a pointing system for addressing objects; provide a system and method based on Global Positioning System (GPS) and Internet and/or database communication. Ellenby '875 is not exactly a navigation system, but an information based system that requires the Global Positioning System (GPS) to locate the user location. Therefore, any indoor services are likely out of the question and the

requirement for communication with the Global Positioning System (GPS) limits its availability and accuracy.

[0031] The system, as provided by the present invention, determines the location using the beacon signal emitted by the RF tag or beacon, the identification portion of the beacon signal emitted by the RF tag or beacon, Proximity Detection (PD), and Received Signal Strength (RSSI), Time of Arrival (TOA), and Angle of Arrival (AOA).

[0032] Proximity Detection (PD)

[0033] This method relies upon a dense grid of antennas, each having a well-known position. When a mobile device is detected by a single antenna, it is considered to be co-located with the single antenna. When more than one antenna detects the mobile, the closest antenna is the one that receives the strongest signal, and is therefore determined to be the antenna that is co-located with the mobile device.

[0034] This method is relatively simple to implement. It can be implemented over different types of physical media. In particular, Infra Red (IR) and Radio Frequency Identification (RFID) are based on this method.

[0035] Triangulation

[0036] In case more than one RF tag or beacon signal is detected, the process can use triangulation, taking Proximity Detection (PD) a step further. The location of the mobile device is determined by measuring the signal level measurements from each antenna, then applying a triangulation algorithm to optimize the location.

[0037] Like the Proximity Detection (PD) method, triangulation is relatively simple to implement.

[0038] Time of arrival (TOA)

[0039] Time of arrival (TOA) is based on triggering the mobile devices to respond, and measuring the time it takes for the response to complete a transmission back to the antenna. The elapsed time represents the distance between the two. By using distances from a few antennas, a

position of the mobile device can be triangulated. Time of arrival (TOA) is considered to be the most accurate method, because multi-path effects can be filtered out. Yet, Time of arrival (TOA) is considerably more complex to implement, as it requires a modification to the hardware on the mobile device side, as well as special modifications on the antenna or beacon side.

[0040] Angle of Arrival (AOA)

[0041] Angle of Arrival (AOA) is based on finding the direction of maximal signal intensity for each antenna (beacon)-mobile device pairing. By finding an intersection of several direction vectors, a position of the mobile device can be estimated using the Angle of Arrival (AOA). The use of the Angle of Arrival (AOA) technique is considerably less accurate than using Time of arrival (TOA) technique, due to limited angular resolution and the fact that in an indoor environment, much of the signal can be reflected. Also, Angle of Arrival (AOA) antennas are more complex, as they require multi-section, highly directional antennas, and multiple RF circuitries.

[0042] Bluetooth is a newer wireless local networking standard that operates in the 2.4 GHz ISM band, and the range is normally shorter (typically 10-15m, although there are tags with a range of over 300 feet). On the other hand, Bluetooth is a "lighter" standard, highly ubiquitous (integrated into most cellular telephones, PDAs, Personal Computer (PC) peripherals, etc.) and supports, in addition to Internet Protocol (IP), several other networking services. Notably, Bluetooth supports serial port emulation, voice, and various types of object exchanges. Bluetooth RF tag or beacons are small, pocketsize transceivers.

[0043] Every Bluetooth enabled RF tag or beacon has a unique identification (ID). This identification (ID) can be used for locating the RF tag or beacon and providing location information of the mobile device in the proximity.

[0044] The relevant location scenario of the present invention is that of searching for a certain RF tag or beacon. It is the most accurate and the faster response time and it is this method in indoor navigation and locating when and where each RF tag or beacon identification (ID) is a known address position-waypoint.

[0045] Why use Bluetooth in indoor environments?

[0046] Bluetooth has some advantages in the context of indoor location. These include:

[0047] Bluetooth uses a Radio Frequency (RF) in a 2.4 GHz ISM band. In this frequency range, radio waves penetrate obstacles, such as walls and human bodies, albeit with a substantial loss.

[0048] This has two implications:

[0049] The availability of a “hi-there” application, as the Bluetooth receiving device would receive some signal from the RF tags or beacons.

[0050] RF tags or beacons can be placed relatively far apart (typical range is 10-15 meters). This enables a deployment where RF tags or beacons are not necessarily required to include one RF tag or beacon at each way point).

[0051] Bluetooth is ubiquitous: Bluetooth chipsets are being integrated everywhere nowadays (cellular telephones, portable electronic accessories, computing devices, and the like). The RF tags or beacons can be implemented anywhere: inside buildings, along roadways, inside cars or other transportation entities, inside buildings for triggering automation, or in any kind of business triggering application and/or automatically creating a link to an existing system.

[0052] The fact that a Bluetooth location system can locate any Bluetooth enabled device makes it more cost-effective solution. This means that an increasing fraction of humans and mobile assets around would become locatable in a Bluetooth covered site, with no additional hardware cost (no RF tags or beacons attached). The only requirement is to pre-register these devices.

[0053] Bluetooth devices are considered to operate using a low power technology, where battery powered Bluetooth enabled tags or beacons need to be recharged, approximately once a week (or longer, depending upon the usage scenario). Non tags (for example, Bluetooth enabled cellular telephones) are naturally recharged on a regular basis, so they do not need any special recharging. If the Bluetooth enable portable devices (non-tags) are being used to determine a location of the device, the fraction of power consumption added to their usual (non Bluetooth operation) power consumption is relatively small.

[0054] Bluetooth devices are considered to be a low cost technology, having expected high production volumes (hundreds of millions annually) lead to sub five dollar (\$5) cost per chip. It is noted that several Integrated Circuit (IC) manufacturers have already met this goal at the time of this disclosure. This would eventually result in a low price for the Bluetooth tags or beacons, if and when Bluetooth location systems would become sufficiently ubiquitous. Bluetooth protocol is a multi-functional communication standard, where location determination is only one of many services that can be supported by a Bluetooth enabled RF tag or beacon infrastructure. The same RF tag or beacon infrastructure can be used to provide additional network services, particularly remote monitoring and control or just trigger a link to an existing system. In addition, Bluetooth provides voice and Internet Protocol (IP) services (although for the later, WLAN is typically more suitable).

[0055] In open spaces, relatively free of obstructions and walls (for example, a large warehouse, a public hotspot, and the like), Bluetooth technology would suffice to provide a 2 meter error range.

[0056] Conclusions:

[0057] The proposed RF tag or beacon technology offers unique advantages: one is the ability to locate ubiquitous "any tags". Any Bluetooth enabled device (including newer mobile telephones) can be associated with and use the advantage of the Bluetooth beacons. The other advantage is the multiservice nature of the Bluetooth enabled RF tags or beacons infrastructure that enables using the Bluetooth enabled RF tags or beacons for other purposes, such as: determining a location of the Bluetooth enabled device, navigation, remote monitoring and control, triggering an existence, triggering a link to existing systems, triggering or initiating software and for a variety of Location Based Services (LBS), and local push messaging services.

SUMMARY OF THE INVENTION

[0058] In accordance with the present invention, these are the characteristics associated with locating and navigation.

[0059] The proposed system provides a method for locating and providing navigation based on the following unique characteristics:

[0060] In an indoor or outdoor navigation situation the RF tags or beacons would replace the function of the satellites in a Global Positioning System (GPS) based system, wherein the RF tags or beacons in conjunction with the respective software provide the user with the information and directions needed to reach a desired destination.

[0061] The proposed system has three major parts:

[0062] The detection and navigator, the software adapted to provide a method used to display the data and the information from the area triggered as result of being in a close proximity to at least one RF tag or beacon in the area.

[0063] The disclosed method is not a location and tracking system as offered by other systems.

[0064] Small RF tags or beacons are installed in each place designated as a Point Of Interest (POI). The Point Of Interest (POI) can be at a mall, in department store, near a product inside a store, along a street, within a garage parking, in an indoor environment, in an outdoor environment, in a public area, in a commercial area, and the like. The RF tags or beacons can be of configured to employ any suitable protocol, including Radio Frequency IDentification (RFID) (long range type), Bluetooth technology with the option to use long range Bluetooth, Wi-Fi technology, or any other suitable RF transmission protocols. The RF tags or beacons broadcast a unique identification (ID) using the wireless transmissions. The unique identification (ID) identifies the location of the RF tag or beacon, such as the address of the RF tag or beacon, the type of facility, the store, the product, and the like. The RF tag or beacon broadcasts the information, which is adapted to be picked up by the mobile telephone and utilized by the navigator application, via the cellular or mobile telephone or other Bluetooth enabled device operating in accordance with the application, the beacon identification (ID) trigger application and push information to the Bluetooth device or the Bluetooth enabled cellular or mobile telephone.

[0065] The system can serve as an add on to the mall's and/or store's current guide or mapping processes to provide extra assistance to user.

[0066] The navigator:

[0067] The navigator is a cellular telephone application Bluetooth application.

[0068] The user's mobile device would scan the local area for the identification (ID) broadcasted by the RF tags or beacons in the vicinity by way of the Bluetooth system integrated into the cellular telephone. It is important to note that the disclosed solution does not require cellular communication, an Internet access, or a database access to determine the location of the mobile device and that any Bluetooth enabled device can operate the navigation application as a stand-alone device. The beacon system can interface with existing in car system and/or car navigation system.

[0069] The display method:

[0070] The display method is a unique way to bridge existing devices like cellular telephones, in-car systems, in-car navigation, and other Bluetooth devices. The system provides an overlay display method, which places an overlay over an existing navigation system mapping, a floor map, floor images, and the like as a real-time floating display, or as a waypoint to overcome the limitations of Global Positioning System (GPS) based systems and the existing mapping systems. The indicator would be placed as an overlay onto the floor plan image. The display may further include providing a visual indication a circle overlaid onto the floor plan image of the path, wherein the visual indication, the circle, indicates an area of the indoor map where the location information identifies a particular location and the circle provides the accuracy radius circle.

[0071] Mapping: A system and method for mapping an indoor environment is provided. A user's mobile device may receive an indication of a starting point on a floor plan.

[0072] The application on the user's mobile device may prompt the user to travel in a particular direction, or the direction of travel may be determined by the application on the user's

mobile device in response to the user indicating a second location after the user has traveled to the second location.

[0073] As the user travels from the starting point in the designated direction, the application on the user's mobile device may gather information about the indoor environment. For example, the user's mobile device may gather wireless signal strength data, from RF beacons Wi-Fi or Bluetooth in the proximity of the mobile device while the user travels in the designated direction.

[0074] The application on the user's mobile device may associate the gathered information with the path the user traveled from the starting point to the ending point. The operation can be done at the user's mobile device (the cellular handheld device). The association may also be performed by a remote server using data provided by the application on the user's mobile device. As the user travels from point to point, the client device may indicate the area for which valid location information is available based on the path the user traveled and the information the user collected.

[0075] Mapping can be offered as an additional service for the indoor environment based upon an area, a building floor plan, or image mapping.

[0076] The navigation system will enable remote planning based on downloaded local floor plans, the floor mapping, or floor images. The indoor view images of the local building facility, or local navigation, when the location's floor plan can be triggered to download at the destination. An example of this would be at the entrance of a shopping mall, a department store, an amusement park, a museum, a parking garage, a downtown area of a city, and the like.

[0077] The navigation system is based on a network of RF tags or beacons that can be deployed anywhere. The system is accurate to within 10 feet, significantly better than existing navigation systems and Global Positioning System (GPS). The system can work inside a building whereas Global Positioning System (GPS) cannot.

[0078] Local detection is obtained via any suitable Bluetooth interface.

[0079] The system provides information about each facility and/or store, including information about the type of facility, the type of store, a product, and the like.

[0080] By providing the ability to locate the user in an area using any suitable Bluetooth enabled device, such as a Bluetooth enabled cellular telephone with the navigation application and the RF tag and/or beacon method, the system overcomes the anxiety of "Where am I". The system can also be adapted to facility finding a parked car later via the RTP (Return to Parking) feature.

[0081] The system has the capability to perform all the functions of a search function and can become the "Next generation search out of the box".

[0082] The navigation system can be attractive for places that already deploy Wi-Fi and can be used for the existing Wi-Fi devices as a RF tags or beacons.

[0083] In case of an emergency or security situation, the system can provide authorities with information.

[0084] The system eases and facilitates navigation within indoor locations, without requirement of a navigation map or Global Positioning System (GPS). Indoor mapping can be provided as part of the navigation system. The system provides "local" navigation as well as "remote" detection.

[0085] The system allows easy interface or trigger application with existing networks or existing systems.

[0086] The system saves gas, time, money and eases global warming by reducing the time spent searching for destination.

[0087] The navigation method is unique. The navigation system is based upon RF tags or beacons with interface to Bluetooth enabled devices. This feature allows detection and navigation in locations where Global Positioning System (GPS) cannot work, as well as outside, with the ability to guide the user to within 10 feet of the destination, significantly better than any other navigation and Global Positioning System (GPS) based systems on the market.

[0088] The Bluetooth RF tags or beacons are based on a long-range version of the popular short distance communication. This unique feature affords the user the ability to plan ahead from

a remote location, by obtaining identification (ID) about the destination directly from the RF tags or beacons and by accessing the indoor floor plan to be navigated at the destination.

[0089] A major problem with In-Car navigation and Global Positioning System (GPS) mapping is that they cannot guide the user closer than 50 to 200 feet, and only in open places. The navigation system can provide accurate directions to within 10 feet.

[0090] The navigation system will be a challenge to navigation providers and Global Positioning System (GPS) providers as they cannot provide mapping or navigation inside a mall, department store, a parking garage or lot, and anywhere the Global Positioning System (GPS) /Navigation map cannot accurately help navigate.

[0091] Utilizing this innovation, the facilities in the vicinity around the user car are displayed on a floating overlay using either a cellular telephone application, or a stand-alone device, or an existing installed navigation system with or without any mapping.

[0092] The recent introduction of imagery services, such as Google Earth and its competitors, that are offered as an enhancement to Global Positioning System (GPS) at a fee, still provide out of date information, with the unsatisfactory result that users encounter road changes and area development not shown on the maps and imagery.

[0093] Navigation using the mapping or floor plan of a location can be offered as a part of the system. The option of downloading a floor plan can be exercised either remotely or locally.

[0094] Each RF tag or beacon broadcasts a beacon signal continuously and any of the navigation devices will detect the beacon signal and display the identification (ID) and/or data on the user's mobile device in an easy to understand format.

[0095] Using the applications described herein, the user enjoys having the information that they want, when they want it, where they want it, and at an affordable price.

[0096] Once the user is in the vicinity of their destination and the user switches on their navigation device, by being in proximity to installed RF tags or beacons in the area the user's mobile device will automatically receive facility information along a waking route and in all directions around the user.

[0097] No further action is required, more specifically, there is no need to send a request or to access the Internet or the web, or to log on and search a database or central system. Any access to the Internet is to provide a Location Based Service (LBS) like push information, messages, offers, deals, advertising, and the like to the mobile user.

[0098] Other systems are still based on the existing search concept where the user submits a query, the provided server searches and the user waits for a response. The process is impractical, particularly in a condition where the user needs the information immediately. The navigation system provides the information automatically, without submitting any query, and the response takes into account the user's location determined by the proximity to the RF tags or beacons.

[0099] The unique approach to detection of the mobile device within the building does not require any Internet bandwidth or cellular communication to complete a desired procedure. Communication links using the Internet or the cellular network can provide Location Based Services (LBS) and any additional information that can be pushed to the user's device.

[00100] As a result, the proposed processes don't require any delays or waiting for bi-directional communication and access time. The information is provided to the user instantaneous, triggered directly between the RF tags or beacons identification (ID) and the user's mobile device.

[00101] Additionally, each facility type can be coded to include an identifier (ID) to identify the type of facility, such as a store, such as a restaurant, a men's wear store, a women's wear store, and the like.

[00102] Each facility identification (ID) code can trigger or initiate access to information about the respective facility, such as providing automatic waypoint information.

[00103] The disclosed applications, such as the navigator, can operate on a cellular or mobile telephone, without any need for a cellular connection to determine the current location. The disclosed applications also do not need any information from the Global Positioning System (GPS).

[00104] Moreover, the navigation system can solve a Return to Parking (RTP) problem, where the Return to Parking application can aid a user in a scenario where the user forget where he/she parked his/her car. The Return to Parking feature has an option to save the location on a "cellular telephone parking detector" application that will make it easy to locate the user's parked car.

[00105] The navigation solution is designed for global use and is not limited to malls, stores, amusement parks, museums, sports stadiums, and the like. It can be implemented in parking garages, metered parking spaces, or open, non-metered parking spaces. The RF tags or beacons can be installed anywhere, including in locations adapted to trigger or initiate an existing and location based application, adapted to link the mobile device to an existing system and existing software.

[00106] It is envisioned that, in the future, all new construction will have the RF tags or beacons included in the design, even place addresses, a building addresses can be replaced or used as an add-on with the implementation of a RF tags or beacons in the area to be recognized or scanned by any suitable and enabled mobile device.

[00107] The system integrates the navigation as part of an application referred to as NAV4 where the system will provide complete solutions for local navigation in an area where the Global Positioning System (GPS) might not work.

[00108] The navigation system consists of the following parts:

[00109] An infrastructure of RF tags or beacons, wherein each RF tag or beacon is installed in a known location within a localized area.

[00110] The navigation system or application is based on mapping and navigation to and within the location. The aim of the navigation system is to replace or supplement the guide or map of the mall and/or store guide/map. This is accomplished by installing the RF tags or beacons in each store or adjacent to each Point Of Interest (POI).

[00111] The mapping: As the Global Positioning System (GPS) and the associated Global Positioning System (GPS) mapping are not available for indoor applications. The navigation system is based upon a floor plan mapping or floor images that can be made available from each

facility or other suitable source. For planning ahead, the floor plan or the floor images can be downloaded by the navigation application operating on the user's cellular telephone from a remote source by way of the Internet prior to arriving at the desired destination. Alternatively, the information can be automatically provided or triggered when the mobile device arrives at the desired destination.

[00112] The navigation application is adapted to be operable on the most commonly used device in the world today, any cellular telephone having a Bluetooth interface.

[00113] As a difference from other systems and other local based systems, this solution offers a unique approach that can be described as the "search out of the box" as the application does not require a query or a database search; the application only needs to know the identification (ID) of the RF tag or beacon that is located proximate the Bluetooth enabled cellular telephone. The Bluetooth enabled cellular telephone automatically scans and recognizes any local area Bluetooth based RF tags or beacons and determines the user's location using the received and decoded beacon signal, and provides instant information to the user and to the business or businesses in the area.

[00114] A typical application is to guide and/or navigate a pedestrian within an environment, such as a mall, a department store, a specialty store, a conference, a trade show, an amusement park, a university, a hospital, a school, a municipal building, a museum, a subway, a train station, an airport, a down town center, a finance facility, a cruise ship, any type of parking facility, or any other place where Global Positioning System (GPS) is insufficient, provides less than required accuracy, or is inoperable in the environment of the user. For example, the system will be used for navigation by first responders in an emergency or a disaster scenario.

[00115] The navigation system can be part of a broad suite of applications that includes a complete solution for employment by the user from the time that he/she begins looking for a space to park his/her car, the time he/she parks, the time that he/she begins walking to the store, mall, or any other indoor facility, to the time that he/she wants to return to his/her parked car by providing directions to the location of the parking space where his/her car is parked.

[00116] The suite may include:

- [00117] Parking detector and navigation to any vacant or available parking space.
- [00118] Automatic notification of the presence of the user within the place, store, facility, and the like.
- [00119] Nav4 mall and/or Nav4store, which is a navigation solution for use within an interior of a mall, a store, and the like.
- [00120] Return to Parking (RTP), which is a navigation solution to guide the user to the location of the parking space where his/her car is parked.
- [00121] For example, a typical application could be:
- [00122] A pedestrian asks for directions to a specific store within a mall.
- [00123] A pedestrian asks for directions to a specific aisle or product located inside the store.
- [00124] A shopper asks for directions to a specific department located within a department store.
- [00125] A pedestrian asks for directions to a specific Point Of Interest (POI).
- [00126] In an emergency condition, the first response team can utilize the system to obtain navigation about an interior of a smoke filled building.
- [00127] A store owner can use the notification and the knowledge of existence of a user (by way of an identifier associated with the user that is provided by the user's mobile device) for loyalty and rewards programs.
- [00128] The RF tag or beacon identification (ID) can trigger a link to exiting software and aware the local system of the user existence, such as:

A traveler checking into a hotel or resort, the hotel or resort can provide automatic check-in and interface to the hotel or resort front desk system.

A traveler checking into a flight at an airport, wherein the airline provides the traveler with automatic check-in capability to automatically check in with the flight

service personnel when the traveler reach a close proximity to a local, associated RF tag or beacon.

A customer checking into a restaurant or other food service provider, wherein the business will recognize the identity of the customer when he/she is within a close proximity to the local, associated RF tag or beacon.

A pedestrian approaching an advertising area or billboard wherein the advertising area or billboard is adapted to recognize the user when the mobile device associated with the user is determined to be in a close proximity to the advertising area and the system provides the user with customized and/or personalize advertising or other offers.

A customer entering a store, a bank, a facility, and the like would be identified and/or recognized enabling the system additional information or services and/or the ability to inform the merchant of the presence of the customer (the application user).

The RF tags or beacons can serve to track employee time, including check-in and checkout times from any designate area.

The RF tags or beacons can serve as part of a payment process where the user's mobile device and the local proximity of the RF tags or beacons can provide increased security for a mobile payment system.

The local RF tags or beacons associated with the user's mobile device can be part of a local dating system.

The local RF tags or beacons associated with the user's mobile device can create a virtual secure zone for a child, an elderly person, or any other care monitoring condition.

The location of the user as associated with one or more RF tags or beacons located proximate thereto can be interfaced with social networking.

The RF tags or beacons can be employed as part of a solution for parking problems where each parking location can employ an RF tag or beacon with at least one additional sensor to determine if the parking space is vacant and provide parking information. This would be provided in an application that is referred to as nav4parking.

The RF tag or beacon can be installed into or integrated within a vehicle to provide car applications, such as payments, security, car broadcasting, car tracking, car communications, automatically count cars to provide a transportation management with statistically information, and the like.

[00129] A system and method to provide a user information which is related to any Points Of Interest (POI). The navigation system provides detection and navigation referencing, position determination and information related to the object or Point Of Interest (POI). This can be accomplished directly and automatically to the user's application enabled cellular telephone or mobile device upon approaching or within a close proximity to the RF tags or beacons installed in the area.

[00130] Special operation mode (Shopping): Shopping provides navigation to a special, a sale item, and the like within a department store.

[00131] Special operating mode (Museums): Museums provides navigation about the museum's exhibits and interactive information from each of the museum's exhibition to the user's cellular telephone or mobile device by way of a Bluetooth interface.

[00132] Special operating mode (Parking): Parking features are described within two (2) Patents (US 7,899,583 and US 8,941,485, both issued to the Inventor and claimed to be parent applications hereto). Parking provides detection and notification of vacant or available parking spaces within a parking area and navigation to the vacant or available parking spaces as well as navigation or guidance to return to a parked car.

[00133] Special operating mode: Nav store provides navigation inside a store or department store. The navigation feature can guide the user to a specific department, a specific aisle, or a specific product. The navigation feature can optionally include advertising methods and

notifications of special promotions. The navigation feature can also provide the business owner with ability to know, in a way of automatic notification when the user's cellular telephone or mobile device is within a proximity to the local area. When the user's cellular telephone or mobile device is within a proximity to the local area, the system can be adapted to automatically deliver information related to the store or business. The delivered information can be, but is not limited to, deals, coupons, specials and even statistically information about the user's habits.

[00134] Every Bluetooth device's RF tag or beacon has a unique identification (ID). This identification (ID) is adapted to be used for locating the RF tag or beacon and providing location information of any mobile device in the proximity thereof.

[00135] A relevant location scenario is that of searching for a certain RF tag or beacon. The relevant location scenario is the most accurate and the faster response time and is one solution for indoor navigation and locating when and where each RF tag or beacon identification (ID) is a known address position, such as a waypoint.

[00136] Why use Bluetooth technology for indoor locations?

[00137] Bluetooth technology has some advantages in the context of indoor locations. These include:

[00138] Bluetooth technology uses a Radio Frequency (RF) that is in a 2.4 GHz ISM band. In this frequency range, radio waves penetrate obstacles, such as walls and human bodies, albeit with a substantial loss.

[00139] This has two implications:

[00140] Availability of a "hi-there" application based upon receipt of a signal from the RF tags or beacons.

[00141] The RF tags or beacons can be placed relatively far apart from one another. The typical range of the RF tag or beacon is 10-15 meters. Therefore, it is not necessary to deploy one RF tag or beacon within or proximate to each way point.

[00142] Bluetooth technology is ubiquitous. Bluetooth chipsets are being integrated everywhere nowadays (mobile telephones, accessories, computing devices, and the like). The RF tags or beacons can be implemented anywhere, such as within buildings, along roadways, inside cars, in use with transportation entities, inside a home for home automation triggering, in any kind of business, and the like. The system can be used to trigger an application and/or link the device to an existing system.

[00143] The fact that a Bluetooth location system can locate any Bluetooth enabled device makes it more cost-effective solution. This means that an increasing fraction of humans and mobile assets around would become locatable in a Bluetooth covered site, with no additional hardware cost (no RF tags or beacons attached). The only need is to pre-register these devices. Bluetooth is a low power technology which can be deployed as tags, which need recharging of approximately once a week (or longer, depending upon the usage). Non-tags (e.g. BT enabled telephones) are being recharged anyway on a regular basis, so they do not need any special recharging. If the mobile devices are being used for location and/or navigation, the fraction added to their usual (non Bluetooth enabled operating mode) power consumption is relatively small.

[00144] Bluetooth is a low cost technology anticipating high production volumes (hundreds of millions annually) leading to sub \$5 per chip. Several Integrated Circuit (IC) manufacturers have already met this goal. This would eventually result in a low price for the Bluetooth tags or beacons, if and when Bluetooth location systems would become sufficiently ubiquitous. Bluetooth is a multi-functional communication standard, whereby a location application is only one of many Location Based Services (LBS) that can be supported by a Bluetooth infrastructure. The same infrastructure can be used to provide additional network services, particularly remote monitoring and control or just trigger a link to an existing system. In addition, Bluetooth technology provides voice and IP services (although for the later, WLAN is typically more suitable).

[00145] In open spaces, relatively free of obstructions and walls (e.g. a large warehouse or a public hotspot), Bluetooth alone would suffice to provide a two (2) meter error range.

[00146] Waypoint Navigation

[00147] A waypoint is a fixed location with a known address location, preferably using longitude and latitude coordinates. The navigation system is capable of storing a database of waypoints for the following purpose:

[00148] Waypoints mark a destination, a point along the way to a destination, or a point of reference. Normally, in navigating, a "route" consists of one or more waypoints. To traverse a route, the user navigates to the nearest waypoint, then to the next one in turn until the destination is reached. The system has the ability to compute a great-circle route towards a waypoint, enabling them to find the shortest route even over long distances. The system enables users to locate a destination on a map, an indoor floor plan, or an indoor image and define the center of the circle as the waypoint. The system is intended for navigation. The system can generate a suggested route between two waypoints, based on the cartographic database. The system indicates the user's current location and gives advance notice of an upcoming point.

[00149] Because the system knows the waypoint positions, and the distance between them, it is easy to determine the user's exact location (assumed to be the same location as the location of the mobile device).

[00150] Map Matching

[00151] The navigation solution is further enhanced, although it is not essential, when the system knows that the person or object being located is traveling along known routes on a map. For example, the system can assume that people might only follow certain routes in a mall. This is priority information that can be used to "force" the estimated position to be on the nearest point on the possible routes. It is noted that this is easier to predict in an indoor environment compared to an outdoor environment.

[00152] The constraints of indoor construction similarly can be used to refine estimates of the position of a person or object moving within a building, as people and objects do not pass through walls; they travel along corridors and through doorways. It is a best solution for a system in case of an emergency, for a system for homeland security, or a system to locate and inform in a subway environment. One good example is a hotel exit floor map.

[00153] Configuration and Use

[00154] In the indoor application, instead of using the Global Positioning System (GPS), the system uses beacon signals from RF tags and beacons having known waypoint positions that are detected and identified as a demonstration of the concept of using another sensing method. The beacon signal(s) received from one or more RF tags or beacons are used to detect and identify the location of the receiving device and determine the waypoints located proximate thereto. Theoretically, it would be possible to convert the waypoint positions into Global Positioning System (GPS) coordinates and emulate an external Global Positioning System (GPS) data source.

[00155] This system can be useful for providing navigation to first responder personnel, where indoors waypoints have been installed in a particular building in the form of RF tags or beacons, wherein the identifiers of each RF tag or beacon is associated with the known location of the RF tag or beacon. By using the identifier, it may be possible to associate magnetic anomaly information with individual tags as well.

[00156] One of the important features of the indoor navigation techniques is that the technique will enhance the ability of a tactical team's first response team to navigate within the building in which the navigation system has been deployed. Bluetooth enabled RF tag or beacon tracking devices are commonly attached to persons or to moveable objects, so that the objects can be tracked using fixed readers (special purpose radios) deployed at different locations. This is the most common indoor navigation that exists today.

[00157] The navigation method is the "flip side" of this practice and is based on the concept that the detection of a Bluetooth enabled RF device, or RF tags or beacons, in a known, fixed location, by a moving reader, such as a Bluetooth enabled cellular telephone or other Bluetooth enabled device, provides a precise location of a person or a moving object, by the carrier of the cellular telephone or mobile device, who can supply indoor navigation without Global Positioning System (GPS).

[00158] The navigation method provides a low-cost, reliable system for firefighters and other first responders, enabling navigation within an interior of buildings, where a Global Positioning System (GPS) is not reliable. Under certain conditions, the Global Positioning System (GPS)

satellite signals may have been temporarily disabled to prevent exploitation by terrorists. In a more likely condition, the satellite signal can't be received inside the building or other structure.

[00159] The disclosed navigation system foresees this limitation of Global Positioning System (GPS) based systems, and is intended for an environment that is potentially much less friendly to Radio Frequency (RF) signals. More specifically, the environment inside a building that first responders encounter may contain smoke, dust, or flames, and is intended to leverage advances in Bluetooth or other RF enabled tag or beacon technology. The navigation system will exploit the capability of storing critical building information, such as floor maps and emergency escape plans, available for retrieval and navigational assistance using any Bluetooth enabled cellular telephone or other mobile device, when and where it is needed.

[00160] Moreover the navigation system can serve as a navigator for the emergency exit route when and where needed. Each user can load the emergency exit floor plan and escape with the knowledge of the user's exact location along that route.

[00161] Aspects of the scenarios to be included:

[00162] The system identifies and tracks the user (a first response team member), and can further include an option to use the cellular telephone as a beacon.

[00163] The system provides the user with navigation information and directions for safely exiting the building.

[00164] The system provides location information of all team members, by way of an ad hoc network of radio terminals that combine RF and Bluetooth and allow communication chat and messaging between the team members without a need for any Internet or cellular communication. Such an option is not limited to the first response team but can be adapted for any user in an emergency and a non-emergency condition.

[00165] From the outset, the navigation system was designed with the capability to utilize existing technology so the system can be deployed as a standalone system or in tandem by a link with one or more existing systems. The navigation system focuses on employing technology that is already in place that simply needs to be expanded.

[00166] With the implementation of the navigation system, a first response team will be empowered to navigate and find its way in an emergency or a disaster condition. This capability can be a critical life saving power in modern congested urban living conditions; a capability that was not available prior to this invention.

[00167] It is believed that the implementation of the navigation system will assist counter-terrorism activities and, more importantly, will help the first response teams to save lives of people trapped inside buildings.

[00168] Conclusion

[00169] The applications of Bluetooth technology described herein offers a number of unique advantages: The application provides an ability to scan and determine a location using a small RF tag or beacon installed in an local area which emits a signal including the RF tags or beacons identification (ID). The Bluetooth technology provides a low cost and low battery consuming device. The applications of Bluetooth technology can be activated on any Bluetooth enabled device.

[00170] The other advantage is the multiservice nature of the Bluetooth infrastructure that adaptation of the RF tags or beacons for other purposes, such as for navigating, remote monitoring and control, a triggering mechanism to activate applications and/or systems, automatically establish a link to one or more existing systems, provide a variety of messaging capabilities, provide a push for conveyance of information, enable Location Based Services (LBS), and the like.

[00171] Location Based Services (LBS) are rapidly expanding. Outdoor location technologies are mainly based on Global Positioning System (GPS) technologies. Global Positioning System (GPS) are limited or inoperable indoors, and is therefore provide an inadequate solution. As a result, alternative indoor location systems are appearing on the market.

[00172] The need for a system arises from various market segments and applications. One example in the market is the Global Positioning System (GPS) based systems that use integrated positioning and navigation systems based on Global Positioning System (GPS) receivers as the primary positioning technology. Subsequent to the events of September 11th, the Federal

government mandated that Global Positioning System (GPS) capability be integrated into all cellular telephones.

[00173] However, the fact that uninterrupted satellite reception is not possible in many locations is a major limitation of Global Positioning System (GPS) based systems. Densely populated areas and other radio frequency signal shadowed locations, such as urban centers (alternatively referred to as "urban canyons"), generally do not allow proper operation of Global Positioning System (GPS), yet it is in these locations where the need is greatest.

[00174] There is a clear need for a cost effective system that maintains performance indoors, in urban canyons, and in city centers.

[00175] The disclosed application includes finding a solution to this task by providing a system and method to automatically generate waypoints along the user's route either in an indoor environment or an outdoor environment.

[00176] The disclosed application addresses the task of interactively guiding the user to a desired indoor destination and/or a desired outdoor destination.

[00177] The method for mapping an indoor environment is provided. A user's mobile device may receive an indication of a starting point on a floor plan. The application operating on the user's mobile device may prompt the user to travel in a particular direction, or the direction of travel may be determined by the user's mobile device in response to the user indicating a second location after the user has traveled to the second location.

[00178] As the user travels from the starting point in the designated direction, the user's mobile device may gather information about the indoor environment. For example, the user's mobile device may gather wireless signal strength data, from Wi-Fi or Bluetooth enabled RF beacons located in the proximity of the user's mobile device, while the user travels in the designated direction.

[00179] The user's mobile device may associate the gathered information with the path the user traveled from the starting point to the ending point. The operation can be done at the user's

mobile device, such as a cellular handheld device. The association may also be performed by a remote server using data provided by the user's mobile device.

[00180] As the user travels from point to point, the user's device may indicate the area for which valid location information is available based on the path the user traveled and the information the user collected.

[00181] The method may include displaying a floor plan image, a floor mapping, or a floor indoor view. The floor images correspond to an indoor location, receiving a first input to indicate a first location on the floor plan image, gathering initial location information at the first location, and generating an indoor map, using a processor, using the initial location information wherein the indoor map includes an association of the initial location information with the first location.

[00182] The method may further include repeating the location information gathering process at a new location to associate new location information with the new location in the indoor map.

[00183] The method may include gathering additional location information as the user travels from the first location to a second location, receiving a second input to indicate the second location on the floor plan image, determining a path from the first location to the second location, and associating the additional location information with at least one location within the map corresponding to the path.

[00184] The method may include prompting the user to walk in a straight line when traveling from the first location to the second location.

[00185] The method may include providing instructions to the user to travel in a particular direction. The location information may be included in wireless signal data associated with one or more wireless RF tags or beacons installed in the local area. The first input may include performing a selection operation with an indicator placed on the floor plan image.

[00186] The method may also include providing a visual indication on the floor plan image of the path. The visual indication may indicate an area of the indoor map where the location information identifies a particular location. The building floor plan may be received from a

remote server by way of the Internet or a cellular communication as part of the mapping and navigation application.

[00187] The method may also include a step of determining an approximate location determine by proximity to the RF beacons, providing the approximate location to the remote server, receiving a list of floor plans associated with indoor environments proximate to the approximate location, and selecting the building floor plan from the list. The method may include identifying the user's direction of travel by at least one of: (a) determining a relative orientation using the first location and the second location, or (b) using at least one of a user's mobile device built-in sensors, accelerometer, a gyroscope, or a compass.

[00188] The method may include a step of determining a degree of precision of the location for the data gathering operation, and using the degree of precision of the location to determine a location resolution for the indoor map. The degree of precision of the location may be determined using a number of available RF tags for beacons for which signal strength data and the beacons identification (ID) are available. The degree of precision of the location may determine at least one of the sizes of an indicator for indicating the current location, the size of the accuracy radius circle, or the width of a stripe for indicating an area of the indoor map for which the location information has been gathered. The application will display an appropriate overly on the floor map, the image map, the building map or any other applicable display map image. The method may include determining a coverage level of the indoor map compared to the floor plan images.

[00189] The navigation system and method automatically updates waypoints, when each Point Of Interest (POI) will have an RF tag or beacon that will broadcast an RF identification (ID) signal that will provide an instant detection. The navigation system will execute the specified file or program that will automatically trigger execution of a waypoint generation program.

[00190] For some years, local governments, in cooperation with various FM radio stations and recently a navigation system, have been putting together an automated way to get real time traffic data into cars so drivers can avoid traffic related issues. Real time traffic information includes news such as: congestion, construction, traffic accidents, recommended alternative

routes, and the like. Currently available navigation systems depend on fix sensors or cameras and some navigation on manual information provided by the users or drivers.

[00191] An RF tag or beacon will be installed at each desired, known location or at each Point Of Interest (POI). Each RF tag or beacon will broadcast an RF signal containing an identification (ID) to be received and recognized by the mobile device and such information (including the RF beacon ID) will automatically transfer by way of the user's mobile device to the provided location detection of the user as well as statistical information about any possible traffic in the area. Such a method can be extremely helpful to manage and control a transportation system.

[00192] The user will no longer need to enter his/her way points manually and then wait for the provider of maps or Global Positioning System (GPS) to update their maps with the information. The process of updating the maps can take about a year in some cases. This way the user will receive the information that the user needs when the user needs it and where the user needs it upon entering an area with RF tags or beacons, providing an automatic check-in for the user and the facility business.

[00193] Again, no communication is needed to be established between the RF tags or beacon and the user's mobile device to enable detection of the RF tags / beacons. In the event that more information is desired or required it may be necessary to connect to a website or other server by way of the Internet.

[00194] It is believed that sooner or later it will be a standard procedure to install an RF tag or sensor on every location of interest (waypoint) or any place along any road, in an indoor environment, in an outdoor environment, or within any business. The RF tag or sensor will provide waypoint information to each user. Most waypoints, such as stores or other Points of Interest (POI) will be willing to pay for a RF tag or beacon or pay a subscription fee to be included on the map on the local area. This can include payment for an annual listing (similar to the telephone directory).

[00195] The system can interface with existing Global Positioning System (GPS) outdoor mapping as well as indoor mapping. The system can automatically switch between an outdoor application which is adapted to employ an outdoor map and receive information based on Global

Positioning System (GPS) and an indoor application which is adapted to receive an indoor map and indoor navigation employing the RF tags or beacons.

[00196] Presently Global Positioning System (GPS) providers, map providers and search engines provide: City navigators and metro guide maps that contain many thousands of attractions.

[00197] These include: Food and Lodging, Attractions, Entertainment, Shopping, Services, Transportation, Emergency, and Government offices. In most areas, the maps provided are not updated and sometimes provide misleading information. Some of the waypoints listed appear to be very old and the information associated with them is not update. Listed Attractions include theme parks, museums, libraries, schools, parks and such. This feature is very useful when a user is located within an unfamiliar area.

[00198] Waypoints will be located automatically in the local area and plotted on the map displayed upon the screen of the mobile device. The waypoints can be stored on the local map at the handheld telephone or mobile device for future access.

[00199] The navigation system will revolutionize Global Positioning System (GPS) based systems and the mapping industry, from Global Positioning System (GPS), mapping companies' communication providers, car manufacturers to telephone directories and local guides. For the first time, the user of a Global Positioning System (GPS) navigation system will have an easy, reliable way to reach a destination inside buildings facilities, which can be referred to as the indoor world.

[00200] The most common problem with today's Global Positioning System (GPS) based systems is that navigation and mapping is not existent in an indoor environment. The disclosed navigation system provides the solution for this problem. Using the navigation system, the user will know where the user is, be able to accurately identify landmarks around the user, and receive automatic updates directly from the Points Of Interest (POI) in the vicinity that get automatic notifications about the user's presence in the respective area.

[00201] The navigation system is based on RF tags or beacons, each RF tag or beacon is associated with a waypoint and has its own identification (ID) (identifying the waypoint by type,

address, etc.). The RF tag or beacon will broadcast, using Radio Frequency (RF), the identification (ID) to be scanned and picked up by the Bluetooth enabled mobile device. The identification (ID) provides a detection method and triggers a location identifier presented as a floating information image on the indoor map, wherein the location identifier references the user's location. The floating image or display will provide automatic waypoint updates around the local area and will allow the user to search local providers, such as waypoints, stores and the like; without any connections, communication, access to the Internet, or cellular communication. The signals received from the RF tags or beacons are the only information required to determine the location of the mobile device, as well as an accuracy radius circle. Access to the Internet or any other web communication provides more information such as push notification and messaging and Location Based Services (LBS) such as deals, direct advertising, and the like, all of which can be automatically conveyed to the user's mobile device.

[00202] Once the user is in the vicinity of their destination, a notification is automatically sent to the Internet, a website, or a business. The user will automatically receive the facility information along an associated waking route and in all directions around you.

[00203] No further action is required. There is no need to send a request or to access and search a database or a central system.

[00204] Conversely, other systems must send a request to a central system, or to a database, and then the user must wait for a response. This takes time and a communication link.

[00205] The disclosed unique approach provides results without any delay or waiting for communication or authentication and access time as there is no real communication between the RF tags or beacons and the user's mobile device. The result are instantaneous based upon the association, directly between the RF tags or beacons and the user's mobile device or other navigation device

[00206] The RF tags or beacons broadcast their identification (ID) to be scanned and pickup by the user's mobile device to identify the location of the user using a proximity to the RF tags or beacons.

[00207] Additionally, the identification (ID) identifies the type of facility, the store, and the like. For example, the Identification (ID) can state whether the facility is a restaurant, a men's wear store, a women's wear store, and the like. The Identification (ID) can include the location of the user respective to the store, such as in the front of the store, in the back of the store, and the like.

[00208] Each facility can provide information about the store. For example, the automatic waypoint information of the user's presence can trigger or initiate an automatically notification to the business or other waypoint in the local area.

[00209] Due to the limitations of the mapping system currently used by the Global Positioning System (GPS) navigation system, the associated display method provides a unique solution to bridge existing devices like cellular telephones, in-car navigation and other Bluetooth devices. The disclosed navigation system provides an associated overlay navigation display method as a real-time floating display, or as a waypoint to overcome the limitations of current Global Positioning System (GPS) based systems and the existing mapping systems; especially indoors where each waypoint will be displayed over indoor maps or floor map images.

[00210] The display method is one unique way to bridge existing devices like cellular telephones, as a real-time floating overlay on a directional circular display to overcome the limitations of Global Positioning System (GPS) based systems and the existing mapping systems.

[00211] The overlay add-up device/display works like a VOR and provides add-up display which automatically shows the user their location in the immediate area in a circle, which includes a radius representing an accuracy and proximity distance from the locally detected RF tag or beacon.

[00212] The overlay displays over an existing navigation system, portable device or cellular telephone without Global Positioning System (GPS) support providing a circle that shown the location accuracy of the user on the local map.

[00213] The fact is, no digital maps are entirely accurate. A user needs to know which map makers are used by the product that they are interested in and check the maps for the area that

they are concerned about. In addition, some map databases are created from vector data while others are just scanned copies of paper maps. In addition to mapping data, these same map makers can often provide Points Of Interest (POI) data. However, a software company might use the maps from one company and the Points Of Interest (POI) data from another company. Points Of Interest (POI) data normally takes three forms. One is public buildings, parks, airports, and possibly geographic objects. A second is government locations that include specialized points lists like marker buoys, and airplane markers. Finally, there are commercial establishments that usually include some information about their products and contact information. The location of commercial places is often derived from the street address and is not based on the actual latitude and longitude location information. Moreover there is the sky high cost of digitizing and updating the Points Of Interest (POI) and the waypoints.

[00214] The task is to provide a solution when the user will receive real time Point Of Interest (POI) or waypoints in the area where the user is automatically associated with a located proximity to RF tags or beacons in the area. The waypoint information can be information that is provided in real time, or essentially updates in real time and can be changed according to the waypoints and all according to a proximity detection of the RF tags or beacons identification (ID) in the area. The information can be used in these example applications:

[00215] The user may wish to locate an empty available parking space in the vicinity of the user. Just think of the empty parking spaces as waypoints. The system will determine if each parking space is vacant or occupied using the RF tag or beacon and associated sensor. The RF beacon will broadcast identification (ID) only when the parking space is available. The user's Bluetooth enabled mobile device will scan the area for the broadcasted signals from the beacons to find the available parking, such method describe in more details with US Patent 7,899,583 (issued to the Applicant, claimed as a copending parent application, and incorporated herein by reference).

[00216] The user may wish to see and locate real estate property available in the area proximate the user's location. An RF tag or beacon can be installed in each real estate property to trigger a request for more information. The additional information would be forwarded to the user or possible client when the user reaches a proximity to the property.

[00217] The user may wish to locate a specific store in a shopping mall. Waypoints can be as broad as a store in a mall, a particular aisle in a department store, or as narrow as a specific item on a shelf.

[00218] The user may wish to locate a specific conference room in a convention center, a Point Of Interest (POI) in an amusement park, or a Point Of Interest (POI) in a museum.

[00219] The user may wish to find the emergency exit route during an emergency or the first response team may need navigation within a facility in an emergency situation.

[00220] The user may be looking for a train location at a station, or a stop along a route of a subway or other underground train system. All of this information would be updated, including the waypoints, in real-time.

[00221] It is believed that the automatic updates of waypoints revolutionizes the Global Positioning System (GPS) and Navigation Industry.

[00222] For the first time the user will know the information the user wants and receive the information when the user wants or needs the information; all according to the location of the user.

[00223] The local business owner can automatically introduce associated content in real time to the users in the area of the business when the user accesses or enters the respective store. The content can include deals, coupons, and specials and provide more information to user about the business. The business, in turn, can benefit from statistical information about the clients, such as habits, a client profile, loyalty and rewards.

[00224] The Global Positioning System (GPS) and navigation industry can tap to the huge local advertising market, which is estimated to be \$134 Billion in the US alone.

[00225] Automatic notification of user existence in the place, the store, the facility, and the like.

[00226] Mall or store navigation solution inside the mall or the store.

[00227] Return To Parking (RTP) can assist the user in returning to the location where the user parked their car.

[00228] For example, a typical application could be:

[00229] A pedestrian asks for directions to a specific store within a mall.

[00230] A pedestrian asks for directions to a specific aisle or product inside the store.

[00231] A shopper asks for a specific department within a department store.

[00232] A pedestrian asks for directions to a Point Of Interest (POI).

[00233] In an emergency, the first response team requires navigation inside a smoke filled building.

[00234] A store owner can use the notification and the knowledge of existence of the user for loyalty and rewards.

[00235] The identification (ID) of the RF tag or beacon can trigger a link to existing software and notify the local system of the presence of the user such as:

[00236] A traveler is checking in into a hotel or resort. The hotel or resort can provide with automatic check in and interface to the hotel or resort guest receiving system.

[00237] A traveler is checking in to a flight in the airport. The airline provides the traveler with an automatic check in for the flight when the traveler reaches a close proximity to a localized RF tag or beacon.

[00238] A customer is checking in to a restaurant or food service. The business will recognize the customer when the customer is in the proximity of the local RF tag or beacon.

[00239] The pedestrian reaches an advertising area or billboard that can be recognized by the user located a close proximity to the advertising area and provides the user with customized and/or personalize advertising or offers.

[00240] A customer is entering a store, a bank, or any other a facility, wherein the user is recognized accordingly and the facility provides additional information or services.

[00241] The RF tags or beacons can serve to track an employee's work times, including a check in and checkout times from a designate area.

[00242] The RF tags or beacons can serve as part of a payment process, where the user's cellular telephone and the local proximity RF tags or beacons can provide additional security for a payment process.

[00243] The infrastructure provided by local RF beacons can be integrated into a local dating system.

[00244] The local RF tags or beacons associated with the user mobile can create a virtual security zone for a child, an elderly person, or any care monitoring.

[00245] The location of the user can be associated with the local beacons, which can be interfaced with social networking.

[00246] The RF beacons can be integrated into a solution for parking related issues where each parking location can be identified by an RF beacon. The solution would include additional sensor to determine the occupancy status of the parking space (referred to by the Inventor as nav4parking). This process can determine whether a parking space is occupied or vacant and provide this and other parking information to the end user. The RF beacon will broadcast a parking space identification only when the parking space is available. The user's Bluetooth device will scan the area for the signal from the broadcasting beacons to aid in locating the available or unoccupied parking space(s). This method is described in more details in US Patent 7,899,583 issued to the Inventor and claimed as priority herein.

[00247] The RF tag or beacon can be installed into or integrated within a vehicle to provide vehicle related applications, such as payments, security, car broadcasting, car tracking, car communication, and automatic car counting. The proposed system can automatically provide transportation management with statistically information.

[00248] A system and method to provide a user with information which is related to the Point Of Interest (POI), the navigation system provides detection and navigation references, position determination and information related to the object or Point Of Interest (POI) directly and automatically to the user interface, such as the mobile device, upon arriving to a close proximity to the RF tags or beacons installed in the area.

[00249] Moreover the application provides more than simply an icon.

[00250] At present, no prior art utilizes the capabilities to display a real time representation of navigating and get an update directly from the waypoints. Also most systems are designed for the old query type search where interface to Internet and or database central system is needed.

[00251] The navigation system automatically detects a signal directly transmitted from the RF tags or beacons installed at the waypoints. No communication is required to be established between the mobile device and the RF tag or beacon, including cellular communication, and no pairing is required. Other systems must have bandwidth available, wherein the bandwidth is used to send a request to a central system or to another remote database and then the system must wait for a response. Alternatively, other systems require Internet connections. This takes time.

[00252] Even if other currently available systems have bandwidth, those systems are still based on the existing search concept where the user submits a query, searches and waits for the response. This can be impractical. The navigation system provides the information automatically, without submitting any query, and the response is according to the user's location based on RF tags or beacons installed in the local area.

[00253] Again, most of the existing prior art is based either upon a Global Positioning System (GPS) based system or an existing car navigation system, which coincidentally also depends on a Global Positioning System (GPS).

[00254] The existing mapping used by these systems has the same limitations as described previously, and is impractical.

[00255] The disclosed navigation system bridges the gap between the Global Positioning System (GPS) based navigation systems and provides a complete solution.

[00256] U.S. Pat. No. 7,031,875 to Ellenby et al. describes a pointing system for addressing objects, and provides a system and method based on Global Positioning System (GPS) and Internet or database communication. The system taught by Ellenby, et al. is not exactly navigation but an information based system that requires the Global Positioning System (GPS) to locate the user's location. Because of the reliance upon the Global Positioning System (GPS), indoor services is likely out of the questions and the need for bi-directional communication as well with Global Positioning System (GPS) limits its availability and accuracy. The system taught by Ellenby, et al. does not provide real time updates of the waypoints and needs access to the Internet and or a central database.

[00257] One common problem with today's Global Positioning System (GPS) based systems is that the mapping and the waypoints are not updated on a timely basis. In most areas, the maps provided are not updated and sometimes provide misleading information. Some of the waypoints listed appear to be about two (2) years old. The new service like **GOOGLE EARTH** provides satellite images that are almost two (2) years old and for sure can't provide an on-line and real time accurate picture of the existing area and the associated waypoints.

[00258] The disclosed technology offers a solution to this task by providing a system and method to automatically generate waypoints along the user's route either in an indoor environment or an outdoor environment. The updates are based on the determined location of the mobile device in proximity to installed RF tags or beacons and the updated information can be triggered by the determined location. Such a method does not exist in today's navigation or mapping, especially in an indoor environment.

[00259] The disclosed technology offers a solution that interactively guides the user to a desired destination, independent of the location being indoors or outdoors.

[00260] The disclosed navigation system and method automatically updates waypoints, by using an interface to an existing Global Positioning System (GPS) based system, when each Point Of Interest (POI) will have an RF tag or sensor that will broadcast an RF signal that can be converted to a Global Positioning System (GPS) waypoint, In response to the RF signal (from the RF tags or sensors), the navigation system will execute the specified file or program that will automatically trigger a waypoint generation program.

[00261] For some years, local governments, in cooperation with various FM radio stations, have been putting together an automated method to provide real-time traffic data to vehicles so drivers can avoid traffic. Real time traffic information includes traffic conditions, such as: congestion, construction, traffic accidents, and recommended alternative routes.

[00262] A Bluetooth and/or Wi-Fi enabled RF tag or beacon will be installed at each Point Of Interest (POI). Each Point Of Interest (POI) will have an RF tag or beacon that will broadcast a wireless RF signal with identification (ID) that will provide an instant detection. The navigation software or other application for Location Based Services system will execute the specified file or program that will automatically trigger waypoint generation program, and, at the same time, provide the business owner a notification of existence of the user in the vicinity of the business to allow the business to provide the user with relevant messages or offers, more information or push message to the user cellular telephone just by being in proximity to the RF tag or beacon.

[00263] The user will no longer need to enter his waypoints manually and then wait for the providers of maps or Global Positioning System (GPS) to update their maps with the information (this can take about a year in some cases). This way the user will receive the information that the user needs when the user needs it and where the user needs it.

[00264] It provides a process that automatically triggers delivery of information according to the RF tag or beacon located in the proximity of the user. The information would be provided directly from the local area business waypoints and to the user's display device. The detection of the user can be accomplished without any bi-directional communication. In the event that more information is required and/or the business needs to provide more information, it may be necessary to connect to the Internet. The connection to the Internet allows an interaction or engagement based upon a proximity to the Bluetooth enabled RF tag or beacon. This can trigger specific application functionality and provide automatic notification of "I am here" to the business owner.

[00265] It is believed that sooner or later it will be commonplace to install a RF tag or beacon on every location of interest (waypoint) or within any business will provide waypoint information as a method to provide each user with the information. Most stores, Point Of Interest (POI) or other waypoints will be willing to pay for a RF tag or beacon or pay a subscription fee

to be on the Global Positioning System (GPS) system providers that are able to show their location and information on a map. Alternatively, the merchants would pay for an annual listing (similar to the telephone directory).

[00266] The disclosed system can interface with the existing Global Positioning System (GPS).

[00267] Present Global Positioning System (GPS) providers, map providers, and search engine providers, such as City Navigator and Metro Guide Maps, contain thousands of attractions.

[00268] Other waypoints that can be included: food and drink locations, lodging, attractions, entertainment, shopping, service providers, transportation, emergency facilities and government offices.

[00269] In most areas, the maps provided are not updated and sometimes provide misleading information. Some of the waypoints listed appear to be about two (2) years old. Listed attractions can include theme parks, museums, libraries, schools, parks and the like. This feature is very useful when a user is located in an unfamiliar area. Waypoints will be automatically included in the local area and plotted on the map screen. The waypoints can be stored in the Global Positioning System (GPS) database for future access or stored on the user's mobile device.

[00270] The navigation system will revolutionize Global Positioning System (GPS) based systems and the mapping industry, from Global Positioning System (GPS), communication providers for the mapping companies, car manufacturers to telephone directories and local guides; for the first time the user of a Global Positioning System (GPS) navigation system will have an easy, reliable way to reach a destination.

[00271] One common problem with today's Global Positioning System (GPS) based systems is that the mapping and the waypoints are not updated on a timely basis. The disclosed navigation system provides a solution for this problem. Using the disclosed navigation system, the user will know where the user is, be able to identify landmarks around the user accurately, and receive automatic updates directly from the Points Of Interest (POI) located in the vicinity of the user.

[00272] The navigation system is based on RF tags or beacons installed in the local area. Each tag or waypoint has its own identification (ID) (identifying the waypoint by type, address, etc.). The RF tag or beacon identification (ID) and proximity to the RF tags or beacons will allow localized detection and interface with existing or indoor application and navigation, Global Positioning System (GPS) based systems, as a floating information display on the Global Positioning System (GPS) map referenced to the user's location. The floating display will provide automatic updates of waypoints and will allow the user to search local providers (waypoints and/or stores and more information about the store or business. The localized detection allows the local businesses to have an automatic notification when the user approaches or is within the proximity to the business and allow him to provide the user with more information about the store, the business, any deals, and the like.

[00273] The task is to provide a solution where the user will receive real time Point Of Interest (POI) or waypoints in the area automatically to the user's existing navigation system or to the user's cellular telephone. The waypoint information can be a real time information update in real time and can be changed according to the waypoints.

[00274] A cellular telephone application, which the user will scan the area for exiting Bluetooth or Wi-Fi enabled RF tags or beacons will receive data and more information utilizing the cellular telephone's Bluetooth capability.

[00275] The system can trigger an application as well as a link to any existing system and software. A notification can be sent to a web, email a web-based application or even interact with a social network. The navigation system will interface with existing in-car media system and in-car navigation systems.

[00276] It is understood that the waypoint or Point of Interest (POI) will be represented by the following suggested identification (ID) examples as part of the beacon identification (ID) to be recognized by the user Bluetooth mobile device (cellular telephone), according to the type of the Point Of Interest (POI):

Waypoint

ID Code	POI Type	Cat. Type
32	Food/Restaurants	Food
33	Gas Station	Information
34	ATM/Banks	Finance
35	Department Store	
36	Apparel Store	
37	Sports Store /	Information
38	Books video	Store
39	Jewelry	Store
40	Toys/Photo/Elect.	Store
41	Music	Store
42	Gifts	Store
43	Furnishing	Store
44	Service	Service
45	Computers	Store/Service
46	Hairstyle/Cosmetics	Store/Service
47	Office	Office
48	Security/Police	Service / Emergency
49	Children's program	Service
50	Social Affairs	Religious / Service
51	Religion	Religious
52	Phone	Service
53	Travel	Transportation / Service
54	Parking Transportation	Service
55	Guest service	Service
56	Library	Service
57	Transportation Management	Service
58	Municipal	
59	Post Office	Service
60	Government	
61	Market	Store/Service

62	Alarm	Emergency
63	Emergency	
64	Hotel resort and cruise ship	
65	Education facility, school, university	
66	Sport facility, sports arena, stadium	
67	Conference and show	
68	Amusement park	
69	Implements as mail and address	
70	Implements in a road as road sign or transportation entity	

[00277] The identification (ID) described above is only are suggested examples. The fact is that part of the beacon identification (ID) will be to recognize the facility, the store type, or the location to provide instant detection and determine the user's location by just being in a close proximity to the RF tag or beacon in the localized area.

[00278] The navigation system enables remote and local update of the local floor plans and the information about the local area and waypoints business in the area, when the location's indoor application can be triggered to download at the destination. One example of this would be at the entrance of a shopping mall, a department store, an amusement park, a museum, a parking garage, or a downtown area of a city, where a sign or a shopping mall information sign would provide direct information which would trigger a download of the local application.

[00279] The system can work inside a building whereas the Global Positioning System (GPS) cannot. Local detection is obtained by way of the Bluetooth interface.

[00280] The disclosed system provides information about each facility or store, including information about the type of the facility. For example, the type of store, a product, and the like. The identification (ID) of the RF tag or beacon triggers delivery of information based upon the proximity of the user's mobile device to the RF tag or beacon.

[00281] The navigation system can be an attractive addition to existing deployments of Wi-Fi and Wi-Fi hotspots and a feature for business and cities that deploy Wi-Fi.

[00282] In case of an emergency or security situation, the system can provide authorities with information.

[00283] Utilizing the navigation system, the facilities (waypoints) in the vicinity around the user car are displayed on a floating overlay using either a cellular telephone application, a standalone device, or an existing installed navigation system (with or without any mapping). The information can be pushed to the user's mobile device when the user is in the proximity of the area.

[00284] The recent introduction of imagery services, such as **GOOGLE EARTH** or other similar services, that are offered as an enhancement to Global Positioning System (GPS) at a fee, still provide out of date information, with the unsatisfactory result. For example, users can encounter road changes and area development not shown on the maps and imagery.

[00285] The option of downloading a floor plan can be exercised either remotely or locally as part of mapping or navigation application.

[00286] With the navigation system, the user will have the information that the user wants, when the user wants it, where the user is located, and at an affordable price. Once the user is in the vicinity of their destination and the user switches on their navigation device, the user will automatically receive facility information along the walking route and in all directions around them.

[00287] Additionally, each facility type can be identification (ID) coded (apart of the beacon identification (ID)) to identify the type of the store, and the like For example, the type of waypoint can be a restaurant, a men's wear store, a women's wear store, real estate property, a garage sale location, a special sale. The information is provided as being up to date, real time information; information which can't be displayed and located using today's navigation system. The disclosed system can tap into the local business industry, providing localized advertising.

[00288] Each identification (ID) code can be included as part of the beacon identification (ID), which can trigger a process to access and obtain complete information about the store.

[00289] The system can be operate on a cellular telephone or any other navigation system and would not be limited to a Global Positioning System (GPS) navigation system.

[00290] Moreover, the navigation system can solve the Return to Parking (RTP) problem, where many users might forget where they parked their car. The system has an option to save the location on the cellular telephone, which would employ a parking detector application. The parking detector application provides directions to the user to the location of their parked car, which will make it easy to locate their parked car.

[00291] The navigation system is designed for global use and is not limited to malls, stores, amusement parks, museums, sports stadiums etc. It can be implemented in parking garages, metered or non-metered parking spaces; almost anywhere and in any place; even in any infrastructure.

[00292] It is envisioned that in the future all new construction or infrastructure will have the RF tags or beacons included in the design or built in the structure.

[00293] One feature of the proposed invention integrates the navigation as part of the NAV4 concepts where the system will provide complete solutions for local navigation in an area where the Global Positioning System (GPS) and Global Positioning System (GPS) mapping just can't provide accurate and updated information that is so essential to the user.

[00294] A typical application is navigating a pedestrian in an environment like a mall, a department store, a specialty store, a conference, a trade show, an amusement park, a university, a hospital, a school, a municipal building, a museum, a subway, a train station, an airport, a down town center, any type of parking facility, or any place when and where the Global Positioning System (GPS) cannot be provided or is not accurate or precise enough. The system can be used for navigation by first responders during an emergency or a disaster.

[00295] The navigation system is part of a broad suite of applications that include a complete solution to the user including when the user begins looking for a space to park the user's car, when the user parks their car, when the user walks towards a store or a mall, and/or when the user wants to return to his parked car, looking for the place that the user's car is parked in.

[00296] The suite may include:

[00297] A parking detector and navigation to the empty, vacant or available parking space.

[00298] Nav4 mall or store navigation solution, which provides navigation within an interior of a mall or a store.

[00299] Return to Parking (RTP), which locates the parking space that the user parked their car.

[00300] A system and method to provide user information which is related to the Point Of Interest (POI)

[00301] The navigation system provides detection and navigation reference, a method for determining a position or location of the user, and a method for providing information related to the object- or Point Of Interest (POI) directly and automatically to the user through the user's cellular telephone or other mobile device without any bi-directional communication through the Internet or other method of accessing the web, such as a cellular connection.

[00302] Special operation mode (Shopping) (referred to as NAV4SALE) provides navigation to one or more special sale items within a department store. This is a unique new tool for the business owner as well the customers, wherein the process enables navigation to help the user locate an item within a store or a mall. In one example, the item can be an item that is on a special sale. The application will provide the user with a way to navigate to the waypoint representative of the special sale, a coupon, a special event, a promotion, and the like. The navigation can be provided in an indoor environment or an outdoor environment. This would be an enhancement to local advertising.

[00303] The local advertising market is estimated to be \$134 Billion in the US alone. The mapping capability is at the forefront of a local strategy. Due to the lack of availability of the Global Positioning System (GPS) within an indoor environment, as well with the limitation of its accuracy in an outdoor environment and the delays in updating the associated maps that is provided by the current mapping and Global Positioning System (GPS) industry, there is no real method for tapping into this huge market.

[00304] The navigation system can vitalize the navigation and mapping industry by providing a unique innovation that combines the Global Positioning System (GPS) and the existing navigation as well as the cellular telephone users with an indoor navigation process based upon the local map that will provide the user navigation to a desired location within a mall or a store, to the right store or product within the store, or even an isle inside the store. This technology provides a new marketing tool to the store, mall, or business owner to acquire the customer by using this new service. A new unique way to bring the customers to the product in sale, direct the customer directly to the isle, and more specifically, to the product that you want to move. The store will also have an option to deliver more content (advertising, sale, coupons, promotions, and the like) to the user when the user approaches or enters the store using push technology to the user's Bluetooth enabled cellular telephone.

[00305] Special operating mode (Museums) (referred to as NAY4Museums, NAV SHOW, and NAV CONFERENCE), which provides navigation and interactive information from the museum's show, conference exhibition, and the like to the user's cellular telephone device by way of the integrated Bluetooth interface.

[00306] The application enables the user to explore the museum or the conference show exhibits in a new unique and easy way. The application provides the user with an ability to navigate about a floor map of the museum or the conference center, indoor navigation, navigate to exhibits, restaurants, cafes, lavatories, and the like, by using the software on the user's navigation or cellular telephone.

[00307] Any museum, conference, or show provides the attended a map to the exhibits, some also provide additional audio device (headset) to get more information on the exhibits.

[00308] The navigation system will provide a unique indoor tool that will navigate the attendee about the museum, the conference center, or the show in an easy manner. The navigation system operates to the user's Bluetooth enabled cellular telephone. When the user reaches a desired exhibit the user will be allowed to download information about the exhibits directly to the user's cellular telephone, a mobile device, or a Bluetooth enabled headset. The system provides indoor navigation to the exhibits as well navigation to restaurants, cafes,

lavatories, and the like. The process can be accomplished on the user's navigation device or cellular telephone and would be based upon the facility map.

[00309] Special operating Mode (Mass Transportation) (Referred to as Navtrain) For all the users of a mass transportation system, the navigation system can allow, locate and point the user to the exact station or location along a route, an easy way to navigate in the train, subway, underground system, a new way of subway or bus mapping in either an indoor or an outdoor environment and directly to the user's navigation device or cellular telephone. Every day, millions of people are using the mass transportation system, including trains, subways, buses, and the like. Each passenger depends upon the transportation map for route information, schedules, and additional services provided by the transportation system. Most of the passengers today carry with them a cellular telephone.

[00310] The navigation system will provide the passenger with navigation inside the transportation system, preferably by way of the passenger's Bluetooth enabled telephone. The passenger will know the exact location or station along the route as well any additional optional information such as schedules, and the like. This adaptation of the navigation system provides a new add on service to the transportation providers as well to the passengers, utilizes the indoor navigation method and the ability of the transportation entity to use the RF tag or beacon installed in transportation facilities to have add on to transportation management control system .

[00311] Special operating mode (Parking) (referred to as NAV4PARKING) is previously described in two (2) parent patent applications. This feature provides a process for determining an empty or vacant parking space and navigation directing the driver to the vacant parking space. This is one example of a solution using the RF tags or beacons to become part of a solution to parking problems where each parking location can be associated with an RF tag or beacon and a respective sensor to determine if the parking space is vacant or empty and provide parking information to the user. The RF beacon will broadcast identification (ID) only when the parking space is available. The user's Bluetooth enabled mobile device will scan the area for the broadcasting RF tags or beacons to identify one or more available parking spaces. Details pertaining to this method are described in more detail in US Patent 7,899,583 issued to the Inventor and claimed as priority herewith.

[00312] A new generation of urban parking innovation that answers the most demanding need of any driver, more specifically, knowing where to park. More precisely, finding and navigating to the vacant or empty parking spaces located near the driver. The process will also provide the answer to "where did I park my car?", when the user is returning to the parked car. In our society where time, convenience and comfort are precious, commodities parking is a major headache.

[00313] Parking detection system is the next generation of urban parking and the answer to the most demanding need of any driver, Where to park?

[00314] The navigation system provides a method of self organizing a parking system that will enable municipalities and other parking authorities to easily identify, exploit and manage revenue opportunities, while at the same time, provide better service at a lower operating cost. With the implementation of the navigation system, detecting vacant or available parking spaces and navigating the driver to the available parking spaces will become part of an information revolution.

[00315] With the parking space identification and navigation system, drivers will save time and reduce the frustration of hunting for available parking spaces, and will also save the user money on fuel consumption and car maintenance costs.

[00316] By using and modifying existing technology, the disclosed system will integrate easily with other transportation and communication systems. The RF tag or beacon can be attached to existing parking meters, and in the future will interface with them and can eventually replace them.

[00317] Municipalities will have better control and centralized monitoring of their parking space inventory, resulting from the new generation of urban parking.

[00318] Special operating mode (Real Estate) (Referred to as NAVRealty): A new unique tool to accommodate the real estate industry by providing a seller, a real estate agent, and /or a real estate buyer a process to locate and navigate to available real estate property in the user's area, according to the user's location and directly to his navigation device and/or cellular telephone. The user may wish to see and locate the real estate property available in his area according to his location. An RF tag or beacon can be installed in each listed real estate property. When

approaching or within the real estate property, the association with the RF tag or beacon can trigger a request for and receipt of more information about the available property to the user or client.

[00319] According to the Newspaper Association of America, the real estate advertising market is estimated at \$11.5 Billion. Recently **MYNEWPLACE.COM** joined apartments.com and rent.com in the \$3 Billion on-line apartment listing. **ZILLOW**, a new startup company just raised \$32M in founding with the basic idea to put your house on **GOOGLE EARTH** (a satellite mapping service). **GOOGLE**, **YAHOO**, **AOL**, **ASK** and **MICROSOFT** are looking to develop real estate services.

[00320] The navigation system brings the listings to the user's hand, by combining the navigation system and/or the cellular telephone or other mobile device; the user will be allowed to obtain information associated with the real estate property in the area proximate to the user, wherein the information is updated according to the user's location in real time.

[00321] The user will have the option to search out of the box for property in his area. The navigation system will serve as a new tool for the real estate industry as well providing a search engine for the benefit of the seller, the real estate agent, and/or the real estate client.

[00322] Special operating mode (merchant navigation) (referred to as NAV4STORE and NAVMALL) The merchant navigation provides navigation inside a store or a department store to a specific department, aisle, or specific product, and can include an option for presenting advertising and special promotions. The merchant navigation provides a method to explore an indoor mall, inside a department store, and the like, providing navigation to the store, the department, or to any other right place that the user needs.

[00323] The system provides navigation on the mall map or the store map enabling the user to find their way around using their cellular telephone, navigation system, or other mobile device without use of the Global Positioning System (GPS). The disclosed navigation system will provide a new kind of service and a new marketing strategy for the malls, the stores, and the business owners. The disclosed navigation system can enhance local advertising.

[00324] Special operating mode (Amusement parks or theme parks)- (referred to as NAV4Amusement Park, NAV4ThemePark, and NAV4Amusement Parks) The NAV4Amusement Parks provides the user with navigation to desired attractions as well as a new way to register in a virtual queuing system, all in an easy way using the user's cellular telephone without a need for the Global Positioning System (GPS). Provides a new media add-on service.

[00325] Ever wonder what it will be like to navigate inside the amusements park to the desired attraction, to know the schedules of shows or events at the attractions, utilize a virtual queuing system from a remote device instead of standing in line? With the navigation system, all this can become a reality and go directly to the user's cellular telephone without any need for Global Positioning System (GPS). It is understood that the present invention can provide a new tool and service which would benefit of the amusement parks and the user alike.

[00326] Special operating mode (roadway support) (referred to as NAVSIGN): The roadway support function can provide the user with automatically generated waypoints associated with road signs, wherein the waypoints would be displayed on the user's navigation device, the user's cellular telephone, and/or the car navigation system as a way for secure driving. The information can communicate with the car computer to provide automated support. For example, the system can automatically slow down the car when the car enters a school zone.

[00327] Special operating mode (emergency)- (referred to as NAV EMERGENCY): One of the important features of the disclosed indoor navigation applications is to provide enhanced navigation to the first response team within the buildings in which the team has been deployed.

[00328] The navigation system provides a low-cost, reliable solution for firefighters and other first responders to navigate inside buildings where the Global Positioning System (GPS) is not reliable, as the Global Positioning System (GPS) signal can't be received within the interior of the building or the Global Positioning System (GPS) satellite network may have been disabled temporarily to prevent exploitation by terrorists.

[00329] The disclosed navigation system anticipated these limitations of the Global Positioning System (GPS) based systems, and is intended for an environment that is potentially much less friendly, such as the environment first responders encounter inside a building may

contain smoke, dust, and/or flames, and is intended to leverage advances in ubiquitous Bluetooth or other RF tag or beacon technology.

[00330] The navigation system will exploit the capability of storing critical building information, such as the floor maps and emergency escape plans, for retrieval and navigational assistance by way of a Bluetooth enabled cellular telephone, when and where the information is needed. Moreover, the navigation system can serve as a navigator describing the emergency exit route when and where it is needed. Each user can download the emergency exit floor plan and escape from the building with the knowledge of the user's exact location along the emergency exit route.

[00331] Aspects of the scenarios to be included:

[00332] Identifies and tracks each user (a first response team member).

[00333] Provides the user with navigation information and directions for safely exiting the building.

[00334] Provides location information of all team members using an ad hoc network of radio terminals that combine RF and Bluetooth technology and allows communication chat and messaging between team members without any need for Internet access or cellular communications. This application is not limit to the first response team and can be employed by any user in an emergency and a non-emergency condition.

[00335] From the outset, the navigation system was been designed with the capability to utilize existing technology so the navigation system can be deployed as a stand-alone system or in tandem with existing systems.

[00336] With the implementation of the navigation system, a first response team can be empowered to navigate and find its way in a case of emergency or a disaster. This capability can be a critical life saving power in modern congested urban living conditions that was not available before now.

[00337] It is believed that implementation of the navigation system will assist counter terrorism activities, and more importantly, can help first response teams to save lives of people trapped inside buildings.

[00338] In all, the unique disclosed method can be summarized as follows:

[00339] Provides direct communication between the area (waypoints) and the user (the beacon navigation application and/or the Global Positioning System (GPS))

[00340] Automatic waypoint generation in real time according to the location of the user.

[00341] Use in an indoor environment and/or an outdoor environment, excluding a requirement for use of the Global Positioning System (GPS)

[00342] A business model where the business, store, or store owner can subscribe to a service for including a listing in the navigation/Global Positioning System (GPS) mapping application.

[00343] Providing an overlay floating model, which can work with or without mapping.

[00344] Exclusive of any requirement for Internet access or cellular communication in order to detect and determine a user's location for use in conjunction with additional Location Based Services (LBS) information.

[00345] Capability to interface with the existing system and create and support a link to an existing software and hardware system.

[00346] The option of searching is completed locally on the user's mobile device, without a requirement of a central database or an Internet search.

[00347] Any Bluetooth enabled cellular telephone is capable of running the Navigation or other Location Based Services (LBS) application.

[00348] Provides indoor navigation using an indoor facility map and/or floor images for guidance and navigation.

[00349] All Global Positioning System (GPS) navigation systems lack of real time displays of the waypoints around the driver's or user's route. Therefore, it is inherently probable that the information provided by the Global Positioning System (GPS) maps are old or outdated and are therefore inaccurate.

[00350] The navigation system provides a system and method for automatically generating and updating navigation waypoints along a route in real time. The process can be based upon a proximity of the user based upon the detection of localized RF tags or beacons installed in the area. The recognition of the user within an area can automatically trigger delivery of real time waypoint information along the user's route. The information would be transmitted directly to the user's navigation device and/or cellular telephone.

[00351] The navigation system can present a circular omni-directional display on the map or floor images as a floating overlay shown on an existing navigation map, floor map, or indoor floor images.

[00352] The waypoint data trigger is generated directly from the waypoint beacon's identification (ID). Again, the process can be accomplished without the need for Internet access or cellular communication to determine the location of the user's navigation device.

[00353] The navigation system will bridge the existing navigation system and Global Positioning System (GPS) mapping to new real time information according to the user's location.

[00354] The navigation system will allow for the first time, the navigation and Global Positioning System (GPS) industry to tap into the local advertising market estimated to be \$134 Billion in the US alone. The proposed mapping processes are at the forefront of local strategy. Due to the lack of availability of the Global Positioning System (GPS) in an indoor environment, the limitation of the accuracy of the Global Positioning System (GPS) in an outdoor environment, and the non-updated mapping that is currently provided by the mapping and Global Positioning System (GPS) industry, there is no real tapping to this huge market.

[00355] It is believed that the navigation system can bring a new life to the navigation and mapping industry as well to the cellular providers by providing a unique innovation that combine

the Global Positioning System (GPS) and the existing navigation to the real time information directly from the waypoints, which can be referred to as a COOLSPOT.

[00356] The disclosed invention is directed generally to the field of navigation and, more particularly, to a method for providing navigation to a user, wherein the navigation is adapted for use in an indoor environment or an outdoor environment. Examples of locations include within a mall, a store, a building, a department store. Additionally, the disclosed invention provides Location Based Services directly to the user's navigation device or cellular telephone.

[00357] The proposed applications have identified and resolved a great deficiency in the technology available for local businesses. Location Based Services (LBS) represent a huge advertising and mapping market, estimated at over \$150 billion a year. Location Based Services (LBS) represent a big opportunity in the navigation market that has not been explored yet.

[00358] Existing System and Industry Trends:

[00359] Local mapping today is mostly paper. Mall maps, store maps, mapping of department stores, commercial buildings, hospitals, schools, campuses, municipalities, shopping centers, downtown districts, indoor facilities, building maps, parking areas, parking garages, amusements parks, subway systems, transit maps, museum maps, area attractions maps, hotel and resort maps and even more importantly the emergency maps and procedures posted in buildings.

[00360] Factors in Local Mapping

[00361] Local maps can be of either indoor locations or outdoor locations.

[00362] Local maps are available on paper, on the web, and in some cases on a kiosk in the facility.

[00363] A high degree of accuracy is needed in order to provide usable maps for navigation indoors. The desired accuracy would be less than 10 meters. This accuracy is to adequately support navigation to a store, a parking space, and the like.

[00364] The Global Positioning System (GPS) cannot provide acceptable accurate mapping as it is only accurate to within 100 to 200 feet. This is the reason why the Global Positioning

System (GPS) industry does not provide this type of mapping. The same is true for cellular network providers, as the accuracy is also within 100 to 300 feet, and that is only when the cellular network is available or accessible. Cellular network signal availability is often a problem in an indoor environment and also problematic when it is most needed: during an emergency condition. In most emergency conditions, the cellular networks fail due to power outages, communication issues, and high bandwidth demands. Again, this is the reason that there is no local mapping available for cellular users. (Local mapping equates to accuracy in finding a store, a room, or a parking level within 5 m.)

[00365] At this time there is no indoor navigation solution. The most recent technology provides access to a user's location through a combination of group social networking and a buddy list.

[00366] Most technology available today attempts to locate a moving user within an area. The present invention reverses that idea and lets the user navigate the local area on local maps, using indoor navigation compared to outdoor navigation. Pedestrian navigation is more than locating and navigating. Most likely the user is at or near their destination already. There are two possibilities: either the user is unfamiliar with the surroundings and their task will be to explore the surroundings or the user is looking for a specific product. The user's defined goal can be as simple as buying a new pair of shoes, getting a book, or just going to shop around, exploring a new location, new deals, specials sales, or simply sightseeing.

[00367] The theory is based on the belief that "you are what you do", meaning, services, specials, sales, coupons, discounts, and the like are one key element.

[00368] One main task of indoor navigation is to show the user where specials, sales, and coupons are and directly navigate the user to them. At the same time, the indoor navigation program provides the business owner or operator with a marketing tool that currently is non-existent. The integration of multimodal journey planning and guidance to dynamic waypoints, sales, specials, and complex public interchange facilities, and the like are not adequately addressed by existing systems.

[00369] In some aspects, indoor navigation looks simpler than outdoor navigation. For instance, the geographical area covered is much smaller and the expected speed of travel is much lower, as the user would be walking. However, other aspects make indoor navigation much more challenging. Initially, among these is the unsuitability of Global Positioning System (GPS) and related technologies within an indoor environment. Additionally, in a complex indoor environment, the requirements are more stringent. For example, vertical positioning of the topology and the need for accuracy less than 10 meters to the store, the product, to the aisle containing a desired product, or the parking space cannot be achieved with today's existing systems.

[00370] Navigation within the indoor market represents much greater potential than the outdoor market, as on average, people spend more than 90% of the time indoors.

[00371] The Objectives and Goals behind This Concept: The technology behind the navigation system is quite simple. The technology employs a direct communication between the user's mobile device, cellular telephone, or a Bluetooth enabled device in conjunction with Bluetooth enabled tags, sensors, or beacons installed in a known locations within an area, a building, a store, or a facility without relying on the Global Positioning System (GPS), centralized servers, Internet access or bandwidth, or cellular communication. It is noted, that although these functions are not required, they can be supportive when available.

[00372] The main concept is to use existing off-the-shelf technology, such as Bluetooth technology or Wi-Fi technology, with small modifications and devices with a minimal cost of deployment and to provide a simple indoor technology which can deliver accuracy with an integrated suite of applications. The concept is especially designed for the user or shopper in an indoor environment. The system is based upon RF tags or beacons, such as Bluetooth or Wi-Fi enabled RF tags or beacons installed in the local area. The RF tags or beacons would be scan by the user's mobile device or cellular telephone and use the proximity of the scanned beacon identification (ID) and signal strength to provide an instant detection of a user within the area and would automatically notify the business owner of the presence of the user. The system can also trigger delivery of updated location based information to the user; all without exchanging any paired communication with the RF tags or beacons in the vicinity of the user.

[00373] The System Includes:

[00374] Local mapping or local floor images: The indoor view of the facility is a feature of the application. The facility can offer a download from participating merchants. The download would provide a local map from a proximity information sign, a store information center, a mall information center, a building information center, or a respective server. The downloading can be triggered by the application according to the user's location as determined by the proximity to the RF tag or beacon or preloaded as part of navigation feature or mapping application before the user reaches the area.

[00375] An ability to include special navigation software either as an add-on to existing navigation on the user's cellular telephone or the existing navigation system (car, mobile device) using the Bluetooth enabled RF tags or beacons to determine the exact location and trigger applications.

[00376] An ability to deploy Bluetooth enabled RF tags or beacons in the local area, where each RF tag or beacon will broadcast the identification (ID), wherein the identification (ID) includes the known location waypoint and triggers additional information and/or Location Based Applications (LBS). The Bluetooth enabled RF tags or beacons provide the infrastructure needed to guide or navigate each user in the area. This solution provides a very low cost and fast deployment RF tag or beacon system.

[00377] The ability to use a log of the user's Bluetooth identification (ID) or the Bluetooth identification (ID) as a key (not the cellular telephone number associated with the user) for future marketing purposes or for emergency use. This aggregation of data in conjunction with an association to a proximity of a Bluetooth enabled RF tag or beacon identification (ID) will be invaluable to retailers, businesses, and the like. Bluetooth enabled cellular telephones can be also be used as Bluetooth enabled RF tags or beacons.

[00378] The RF tags or beacons portion of the navigation system are Bluetooth enabled RF tags or beacons installed in known locations within the area or facility. The Bluetooth enabled RF tags or beacons represent waypoints, where the beacon identification (ID) can identify a facility type, a store, a special sale, a place, a location in the facility location, and the like.

[00379] The scanner detection part of the application employs a Bluetooth enabled cellular telephone or mobile device. When the Bluetooth feature and the application are active, the application will periodically scan the area for any Bluetooth enabled RF tag or beacon that is located in the proximity. The scanner obtains the beacon signal and determines the identification (ID) of the RF tags or beacons as well with signal strength. The application will use the identification (ID) of the RF tags or beacons as well with signal strength to determine the location of the user. The location of the user would be displayed on the area map or facility map and will automatically trigger a notification, an automatic check-in to the business owner or operator, and/or establish a link to an existing system to provide the user and the business owner additional information. All of this would automatically be accomplished when the user is located in the proximity of the Bluetooth enabled RF tag or beacon.

[00380] The navigation can be plotted between waypoints, stores, or other places on the map.

[00381] In regards to the sale sense or other marketing tools, the system works by passively observing the initial part of the scanning of movement. The proposed system does not monitor or listen to conversations or text messages. Nor do the proposed applications transmit or intercept any information or interfere with the mobile network operators in any way. The navigation system is a scanning detector (not a receiver or transmitter) which can observe the unique Bluetooth identification (ID) or key set of the mobile device. This is not a telephone number or name of the device. The unique Bluetooth identification (ID) or key set of the mobile device in association to the identification (ID) of the Bluetooth enabled RF tag or beacon in a proximity of can provide aggregate resultant data to a server to collect and maintain information for habits and/or preferences for triggering content delivery.

[00382] Sales sense represents a method to use dynamic user input profiling with proximity beacon identification (ID) installed in the known location in an indoor environment and/or an outdoor environment for empowered presence and triggering content delivery for a real life interaction. All of the functions would be under the user's complete control, without compromising the user's privacy. The paradigm of proximity-based discovery and communication enabled by Bluetooth technology can be very relevant in ambient intelligence as an enabler for a situated interaction.

[00383] The navigation system explores the use of predefined user input (user profile or preferences) as a key driver for situated interaction and triggering of content delivery according to the user profile or preferences. The approach is to use of Bluetooth enabled RF tags or beacons installed in known locations within a local area to trigger action which associate the identification (ID) and or profile / preferences provided by the user's cellular telephone or mobile device beyond self-exposure and introduces a method that can trigger actions.

[00384] The approach to the use of Bluetooth identification (ID) of the Bluetooth enabled RF tags or beacons beyond self-exposure introduces a technique in which the system can recognize the Bluetooth identification (ID) as explicit instructions to trigger actions and/or processes.

[00385] Initially, because the disclosed system has an extremely low entry barrier, as Bluetooth devices are based upon a widely available technology. More importantly, all newer cellular telephones or other mobile devices include Bluetooth technology, and setting Bluetooth identification (ID) of a Bluetooth enabled device is normally a relatively simple task that can be accomplished with the base functionality of any mobile telephone. The easy availability is of huge importance in enabling social practices around the technology and represents a major difference to other sensing and interaction approaches that, albeit more sophisticated, may require specific hardware or software in personal devices. Secondly, the use of Bluetooth presence for situated interaction combines very well implicit and explicit forms of interaction, in fact, blurring the distinction between them. Simply by scanning for Bluetooth devices within the proximity of the mobile device, people are already part of the situation and implicitly engaging with the system.

[00386] This continuous, flow of presence information can be fundamental in the aggregation of situated content and may act as an important catalyst for more explicit forms of interaction. This is what differentiates interactions based on Bluetooth presence from other interactions.

[00387] The chosen methodology combines a user defined profile encoded into the Bluetooth enabled device by setting up a user, such as a Vehicle Identification Number (VIN). With a focus or priority on user privacy, the profile is encoded into the user's Bluetooth enabled mobile device with an algorithm sequence protecting the user's privacy.

[00388] The disclosed system provides an important and practical implementation of the technique and on its usability within the complex set of social phenomena that characterizes situated interactions in public places without compromising the user's privacy. The effectiveness and simplicity of the disclosed system makes it easily adoptable for applications like localized social networking interactions, Near Field Communication (NFC) like secure transactions, payment methods, secure recognized methods and triggers secure processes and delivery of direct content according to the user profile or preferences. All of these functions are accomplished without compromising the user's privacy and provides the user with complete control all the time. The method can be integrated and provide privacy and secure transaction to empower applications that may otherwise exploit the user's identification (ID), the user's profile and the user's privacy, such as a method to provide secure payments transactions.

[00389] Every day, millions of people access the Internet and enter their profile, personal information, or answer questions about their preferences in order to access a service and/or a site, to obtain incentives, coupons, specials, and the like. The sites use the information for marketing and in some cases share or sell the acquired information. Recent research has found that most people are willing to give information for incentives.

[00390] Using the profile and records, collection of Internet surfing habits of the user is one way that search engine companies make money on the Internet. At the same time, search engine companies try to direct content to the user according to their profile and/or habits.

[00391] But what about real life? People spend more and more time indoors. According to recent research, people spend more than 90% of their time indoors.

[00392] A scenario of searching for stores, items, special sales, and coupons according to our desire is repeated again and again. The question is how can the system transfer the success of the Internet marketing tool and the easy search for real life?

[00393] That is the main idea behind the navigation system. What if a system can take a profile, user statistics, and/or user input with them anywhere and provide one or more intelligence marketing tools. Moreover, the user is in complete control over their privacy, as the user can simply turn off or shut down the application.

[00394] In the disclosed navigation system, the user establishes their profile and/or sales preferences, which are encoded into the user's cellular telephone to be associated with the proximity beacon identification (ID) installed in the local area. There are 3 key configurations: A. A set key segment, where segment keys are not unique and help to setup a user segment only. In this case the key is not unique. B. A unique key, wherein a unique key would be a unique identifier, which can be analogous to an Internet Protocol (IP) address. C. A dynamic key and multiple profiles according to a location and/or user preferences.

[00395] The profile can include gender, age, and sales preferences (interest), and does not include any personal profile. It may be the same as seeing the user and recognizing their gender, age, and other preferences just by looking at the user. The user is not revealing any kind of information that most sites ask for in a registration process. More specifically, the profile excludes any personal information like name, address, or telephone number.

[00396] As part of the suite of Location Based Services (LBS) applications, the user's cellular telephone or mobile device will scan the area for the RF tags or beacons. For example, by being proximity close to the directory stand in a mall, the system will receive and a decode the user's key in order to utilize the user preference segments to trigger delivery of ads, specials, and incentives to the user in accordance with the user's profile. The disclosed system also provides the business owner or operator with the best marketing tool, knowing their customers, the customers' profiles and habits. This is accomplished using a very low cost Bluetooth enabled RF tags or beacons installed in the area and an association between the Bluetooth enabled RF tags or beacons with the user's Bluetooth enabled device, such as the user's cellular telephone or mobile device.

[00397] The disclosed system provides a solution to: "Your customer is telling you what they want, are you listening?"

[00398] The main idea behind the disclosed system is to provide the user with pinpoint content according to their desired preferences at the location determined by the identification (ID) of the RF tag or beacon in the proximity of the user and provide directions or navigation to the desired location to the user for such items as the store, sales, specials, coupons, or any other information that the user may be looking for. The disclosed system enables providers to receive

meaningful data around shopper habits and store layouts statistics, as well as to help them partner up to offer better loyalty incentives to their customers through programs that extend beyond single storefronts. The disclosed system provides sensing of second-by-second updates of a shoppers interest about specific product, place and can provide the business owner or operator with a complete set of marketing tools which were previously unavailable, and at the same time, provides the user with offers directly from the business according to the user's habits and/or preferences profile.

[00399] The sales sense is a user preference module, which can be an add-on to the sales sense marketing where the sales sense joins the user behaviors module to create a very unique Location Based Services (LBS) business and marketing model. Imagine a potential customer standing in a crowded store aisle, feeling overwhelmed by all the choices. What if a business associate could just reach out and give the user something to help with the decision, such as a coupon, product information, discounts, and the like in real time? Content marketers will soon have the ability to do this and a whole lot more just by implementing the disclosed system.

[00400] Sales sense or shopping behavior: How consumers decide what to buy and when is going to drastically change. Winning marketing needs to provide and will require getting exactly the right content, in the right place, at the right time, with even more precision. Shoppers will have the ability to collect real time information, comparison pricing, discounts, and other helpful, highly tailored data as the shoppers walk through a store or browse near particular items. It will be imperative to produce well-timed, compelling content that is useful in those crucial moments before a choice is made. Sales sense can become a next generation marketing tools, from coupons and giveaways in stores, to tours of museums, to airports that provide real time flight information. The possibilities are endless.

[00401] Consumers will start engaging with content in a whole host of new ways. Rather than just providing information suitable for a web browser or even a mobile user, marketers will need to think about ways to provide content that will be of value to users as they live their lives. From businesses to city parks, the disclosed system provides a user with tools to access helpful, real time data like never before. As recently published research showed that on average people spend

90% of our time indoors. The proposed invention allows an effective integration of on-line and off-line shopping.

[00402] Moreover, according to research, indoor navigation may be more important than outdoor navigation and may represent a huge new market.

[00403] The disclosed technology allows shopping centers, malls, department stores, buildings, airports, train stations, exhibition centers, museums, and amusement parks to understand the way that customers or passengers flow through the premises. At the same time, the disclosed technology provides the user or shopper with a unique indoor navigation capability without compromising user privacy.

[00404] The disclosed technology will allow, for the first time, the navigation and the Global Positioning System (GPS) industry to tap into the local advertising market, estimated to be \$134 Billion in the US alone.

[00405] The disclosed technology provides a reliable method for identifying the path habits and the behavior that people take through an area. There are a number of advantages to The disclosed technology including:

- Extremely large sample size as mobile penetration is above 90%,
- Shoppers remain anonymous,
- Accurate to within 2 meters, and
- Based on a Bluetooth technology.

[00406] For retail areas, malls in particular, the advantages of understanding shopper behavior are significant. Such information can assist the mall to:

- Evaluate and improve their retail tenancy mix by identifying which stores shoppers consider complementary to one another,
- Identify under-utilized areas in the mall,

- Understand the impact of anchor stores on the mall,
- Measure the implications of particular promotions or center events,
- Assist with planning day-to-day mall operations,
- Provide add-on features for shoppers,
- Provide shoppers with a web-like shopping experience,
- Provide shoppers with incentives and/or advertising,
- Increase security,
- And in an emergency, provides the shoppers with alarm and notification, and
- Allows shopper engagement with the store. The RF tags or beacons can become the small neighborhood store by recognizing the shopper. This is missing from online shopping.

[00407] The disclosed technology would be the only system on the market that can continuously and accurately gather information on a shopper paths based on locally installed RF tags or beacons without any need to establish any communication relationship between the user's cellular telephone or other mobile device and the RF tag or beacon. This is accomplished without any paring or any other bi-directional communication to determine the location, and all without compromising the shopper's identification (ID) or their privacy.

[00408] The various methods disclosed can also provide a way of surveying the behavior and preferences of the user's shopper habits simply by observing the signals (encoding a Bluetooth naming key) transmitted by the user's mobile telephone and associate the Bluetooth naming key with the identification (ID) of an RF tag or beacon located proximate the user and, at the same time, provides the shopper with a unique special application for indoor navigation which can trigger Location Based Services (LBS) applications.

[00409] The present invention provides a next generation approach to the Location Based Services (LBS) market, especially respective to indoor applications and to areas where a Global Positioning System (GPS) cannot provide accurate navigation.

[00410] The data collected using the disclosed technology can be used to provide trend reports showing which shops are most visited and at what times, whether there are sufficient public facilities to serve the visiting shoppers or whether more security staff are needed to name only a few of the potential benefits. Ultimately, the collected data can provide assistance to shopping centers to become more in-tune with their customers so that the shopping centers can create better, more pleasant places to visit.

[00411] The proposed analytics can turn shopping centers, department stores, or other stores into finely tuned sites, enabling operators of the mall or store to direct the flow of traffic efficiently around the information coming from the user to the benefit of the user and the business owner or operator to provide services such as VIP personalize services, and the like.

[00412] In contrast to alternative techniques, there is no device that tracks the user's cellular telephone or other mobile device. In the disclosed methods, the user's mobile device or cellular telephone is the one that scans and tracks RF tags or beacons along the route. Each scan includes the beacon's identification (ID) and the user's mobile device or cellular telephone identification (ID), and while these keys help track the movement of the signal and the user, the disclosed technology doesn't reveal the identity of the user. This is a more precise method than what **GOOGLE MAPS** uses to detect a general location on a mobile device or cellular telephone by cell towers which are accurate between 300-1000 meters compared to the disclosed technology, wherein accuracy which is below 10 meters. The disclosed technology allows the business owner or operator to be notified about the existence of a user in the vicinity of the store and allows sending the user offers, deals, or more information, and, at the same time, collects information that could be very important to the business owner, such as habits, profile, or preference of the user. This enables an ability to provide precise content directly to the user's cellular telephone or other mobile device.

[00413] Example of Scenarios:

[00414] A user in a mall can use a local guide which could suggest that the user download the navigation application at the mall, the building, or the facility. Alternatively, the navigation application can already include a mapping application.

[00415] As part of the application the Bluetooth feature on the user's mobile device will scan for signals from known locations or Bluetooth enabled tags or beacons and will determine the user's location on the local mall map (the same way as a Global Positioning System (GPS)) with accuracy of less than 5 meters. More beacons with less signal range equals more accuracy.

[00416] For example, the Bluetooth enabled tag or beacon can broadcast an RF or beacon signal that includes the position coordinates (for example latitude and longitude coordinates) of the RF tag or beacon, which can be detected by a mobile device. The position coordinates can provide a third location accuracy for the current location of the mobile device by virtue of the mobile device adopting the position coordinates of the beacon as its own position coordinates.

[00417] The known locations of a number of RF tags or beacons in a geographic region (referred to as a beacon infrastructure) can define a geofence that encompasses the geographic region.

[00418] In some implementations, the beacon can also advertise Location Based Services (LBS) provided by the beacon infrastructure. Upon determining that the mobile device crossed the geofence defined by the beacon infrastructure. The application can monitor for RF tag or beacon signals and continuously update the location of the mobile device to be the location of the RF tag or beacon currently in proximity with the mobile device.

[00419] When the mobile device loses contact with the RF tag or beacon for a defined period of time (for example, 5 to 10 minutes) or when the mobile device exits the geofence boundary defined by the beacon infrastructure, the application can transfer the monitoring back to the application subsystem, so that the location of the mobile device can be determined using Wi-Fi and/or Cellular identification (ID).

[00420] In some implementations, the disclosed application can distinguish between RF tags or beacons within the beacon infrastructure and mobile tags or beacons that may be detected

during a scanning step, such as other Bluetooth enabled mobile telephones operating within the beacon infrastructure.

[00421] For example, each beacon in the beacon infrastructure can provide data in its broadcast signal that indicates that the beacon is part of a beacon infrastructure.

[00422] Alternatively, or in addition, when a mobile device makes first contact with an RF tag or beacon within the beacon infrastructure, that RF tag or beacon can transmit to the mobile device a list of unique identifiers, such as an identification (ID) of the RF tag or beacon of other identifiers (ID) of other RF tags or beacons within the beacon infrastructure and other information about the beacon infrastructure, such as a name, geofence data, and/or one or more websites associated with the beacon infrastructure.

[00423] The beacon infrastructure can be located in any geographic region, including within businesses, such as shopping malls, retail stores, restaurants; landmarks such as museums, airports, parks, entertainment venues; and any other environment where Location Based Services (LBS) are desired.

[00424] The available local advertising marketing is huge, with over \$150 billion in revenue in the US alone.

[00425] Indoor Location Based Services (LBS) Applications

[00426] The disclosed concept offers a complete suite of applications including, finding available parking spaces, providing navigation of indoor malls or stores, and a capacity to navigate to emergency exits, all using a low cost solution and with a business model that can be used to attract customers.

[00427] The applications represent a big opportunity in the navigation market and will open up new avenues for companies from telephone operators to malls, stores, department stores, merchants, owners to navigation and mapping companies.

[00428] The disclosed technology presents a low cost and easily deployed infrastructure for location based navigation in both an indoor environment and an outdoor environment, without the need for use of the Global Positioning System (GPS) or access to a cellular network.

Moreover, the concept is especially suitable for local area services (both indoors and outdoors) when and where the Global Positioning System (GPS) and the cellular network can't provide a suitable solution or the degree of accuracy needed to provide such navigation (10 meters or less).

[00429] The disclosed technology provides a system based upon existing Bluetooth protocols, wherein the Bluetooth technology is proven to be stable, simple, inexpensive and mature in the market. Moreover, it is a common communication tool and is available on more than 85% of all new mobile telephones at the time of the original disclosure.

[00430] System Architecture:

[00431] The infrastructure consists of Bluetooth enabled RF tags or beacons installed in known locations in a local area. The Bluetooth enabled RF tags or beacons will respond to Bluetooth device scanning inquiries made by a user's Bluetooth enabled cellular telephone or other Bluetooth enabled device using the special, associated application.

[00432] Each of the RF tags or beacons encodes information into the naming portion of the beacon signal, wherein the encoded information includes the identification (ID) representing the Location as well as the facility or product type. A mobile device as well as any other Bluetooth enabled device, such as a desktop computer, a laptop computer, a portable computing tablet, cars, and the like, can also become an RF tag or beacon providing a new echo system, where an infrastructure can include static and dynamic deployments of RF tags or beacons which interact with one another.

[00433] The local area map, such as a mall map, a store map, a building map, an area map, and the like, will be available to be downloaded as part of a mapping system that can automatically trigger a request to download the associate map when a user approaches or passes an entrance of the building, the mall, any other designated area, or the associated directory to provide the mapping for the navigation application or as part of a mapping and navigation application.

[00434] A user's Bluetooth enabled cellular telephone will scan the local area for the location of RF tags or beacons located proximate thereto. When a user is within 5 to 10 meters, the location beacons respond, providing room level navigation accuracy. The beacon identification

(ID) in conjunction with an associated signal strength will provide instant determination of the location of the receiving mobile device. With multiple RF tags or beacons installed and possibly receiving more than one beacon signal, a simple triangulation calculation and options for signal strength will determine the exact location of the user on the downloaded map of the local area. It is noted that the process can be completed without establishing any communication or pairing between the beacons and the mobile device. The process does not require any connectivity to the Internet. It is recognized that access to the Internet enables access to additional information when additional information is desired.

[00435] When including a list of associated RF tags or beacons, other signals not on the list will be ignored. There is a mixed use of RF tags or beacons and delivery option depending on the application. For example, in a mall application, the stores can have a Wireless Application Protocol (WAP) or use the Internet to automatically deliver more content by way of a push to a user's mobile device where the RF tags or beacons serve as navigation "antennae" as well as triggering mechanism to provide application exploit, waypoints, and content to help the user navigate in the respective area. The applications can include a Sales Sense providing next generation marketing tools, a Behavioral Module, Nav4Parking, Nav4Realty, Nav4Mall, Nav4Sale, Nav4Museurn, Nav4Show, Nav4Train, Nav4Sign, Nav4Emergency, Return2Parking, Nav4Store, Nav4Conference, Nav4Disney, Nav4Events, and the like.

[00436] Moreover, according to research, indoor navigation may be more important than outdoor navigation and may represent a huge new market.

[00437] The disclosed technology disclosed herein enables shopping centers, malls, department stores, buildings, airports, train stations, exhibition centers, museums, and amusement parks to understand the flow of their customers or passengers through their premises. At the same time, the disclosed technology provides the user or shopper with a unique indoor navigation capability without compromising user privacy.

[00438] The technology disclosed herein provides a reliable method for identifying the travel paths, habits, and the behavior that people take through an area.

[00439] There are a number of advantages to the technology disclosed herein, including:

Extremely large sample size as mobile device penetration is above 90%,

Shoppers remain anonymous accurate to within 5 meters, and

The solutions are based upon Bluetooth technology.

[00440] For retail areas, malls in particular, the advantages of understanding behavior of shoppers is significant. Such information can assist the mall in a number of areas.

[00441] The disclosed applications enable evaluation and improvement of the retail tenancy mix by identifying which stores shoppers consider to be complementary. The mobile device or cellular telephone scans and tracks RF tags or beacons along the route. Each scan includes the cellular telephone's unique Bluetooth identification (ID). While these identifications (ID's) help track the movement of the signal and its owner, they don't reveal the identity of the user. This is a more precise method than what **GOOGLE MAPS** uses to detect a general location on a mobile telephone using cellular infrastructure towers, which is accurate between 300-1000 meters compared to accuracy of the disclosed technology, which is below 10 meters.

[00442] Some reports about shoppers show how valuable behavioral information actually is and the profit opportunities that come along with this:

[00443] Where they go? Where they go next? Where they do what? When they do what? Who does what?

[00444] Understand behavioral patterns across demographics. Similarities, differences and much more.

[00445] Sales Sense User Preference Module:

[00446] Recent research has found that most people:

[00447] Measure the implications of particular promotions or center events.

[00448] Assist with planning day-to-day mall operations.

[00449] Provide add-on features for shoppers.

- [00450] Provide shoppers with a web-like shopping experience.
- [00451] Provide shoppers with incentives or other advertising.
- [00452] Provides an automatic check-in method.
- [00453] Provide shoppers with an automatic check in capability.
- [00454] Increase security.
- [00455] In an emergency, provide shoppers with alarm and other associated notifications.
- [00456] The disclosed technology is the only system known today that can continuously and accurately gather information on travel paths of shopper using Bluetooth and/or Wi-Fi enabled RF tag or beacon technology and all without compromising the shopper's identity (ID) or his/her privacy.
- [00457] The disclosed unique and innovative system and method can also provide a way of surveying the behavior and preferences of the shopper simply by observing the emitted Bluetooth signals, such as the Bluetooth beacon identification (ID) associated with the user's mobile device, and at the same time, provide the shopper with a unique special application for indoor navigation as well as Location Based Services (LBS) for the benefit of both the shopper and the business owner or operator.
- [00458] The data collected using the disclosed technology can be used to provide trend reports showing which stores are most visited, what times the locations are visited, whether there are sufficient public facilities to serve the visiting shoppers, or whether more security staff is needed, to name only a few of the potential benefits. Ultimately, the data made available by the disclosed invention helps shopping centers become more in tune with their customers so the shopping centers can create a better, more pleasant place to visit by providing a loyalty and reward program.
- [00459] Analytics provided by the disclosed applications can turn shopping centers, department stores, or other stores into finely tuned locations, enabling the mall, the store, or the store owners or operators to direct the flow of traffic efficiently.

[00460] In contrast to alternative techniques, there is no device that tracks the user's cellular telephone. In the disclosed method, the user is willing to give information for incentives.

[00461] Using the profile and records, the surfing habits of the user, such as by tracing activities of the associated Internet Protocol (IP) address is the way that the search engine companies make money on the Internet. At the same time they try to direct content to the user according to the user's profile or habits. But what about real life? People spend more and more time indoors (according to recent research, people spend more than 90% of their time indoors).

[00462] As part of the suite of Location Based Services (LBS) applications, the user's cellular telephone or mobile device will scan the area for RF tags or beacons in the proximity thereof. For example, by being in a close proximity to the directory stand in a mall, a decoding of the user's key will be processed in order to acquire the user's identity (ID) and/or preference profile. The server will then provide the user with ads, specials, and incentives according to the user's profile, essentially responding to the question: "Your customer is telling you what they want, are you listening?"

[00463] The main idea behind this is to provide the user with pinpoint content according to the user's desired preferences at the location and also direct or navigate the user to the desired location where the user can find the store, sales, special, coupons, or other information that they are looking for. At the same time there is also a benefit to the mall or store owner or operator by getting the next generation's sales tools, getting costumers' habits and their sale's profile, resulting in an ability to better serve better and meet the customer's needs.

[00464] The sales sense, user preference module is an add on to the sales sense marketing where the sales sense joins the user behaviors module to create a very unique Location Based Services (LBS) business and marketing model. The analysis of this spatiotemporal data can supply high level human behavior information valuable to urban planners, local businesses, and the Location Based Services (LBS) marketing.

[00465] Malls, department stores, and store indoor applications are part of NAV4MALL or NAV4STORE.

[00466] The indoor applications and navigation takes a further step to give the user or the shopper next generation shopping tools by providing them with the following indoor applications that could be included in the NAV4MALL or NAV4STORE.

[00467] Map and indoor navigation brings the local mall mapping or store mapping to the digital age. This function allows the user to navigate from waypoint to waypoint on the map directory. The function brings the store directory or mall directory to the cellular telephone.

[00468] Search and Find provides a capability to locate a store a place an item, or a product that would be on the directory represented by waypoints, represented by RF tags or beacons on the loading maps.

[00469] Sales or specials provides a process for informing the user of discounts, sales, and coupons. This feature can be an add-on or a replacement for the mall or store printed flyers that provide the information to the shoppers at points in the mall or store. The feature can even direct the user or the shopper to the aisle containing the products, to coupons, and to other items that the shopper is looking for.

[00470] Parking and Return2Parking provides a process which assists the user in finding parking spaces and the location of their parked car. It is noted that this function does not directly use the same beacons, as the parking the infrastructure employs long range beacons, where in a store or a mall, the beacons can be a shorter range version.

[00471] Info or information is a function where the system provides information about events, restrooms, ATM locations, a seating area, a kid's playground, a fountain, public telephones, and the like.

[00472] Emergency is a very important component of the disclosed innovation. The emergency function provides a unique alarm and notification to the user without depending on other communication links, such as cellular telephones that are prone to failure in an emergency condition. The present invention provides the user with an associated emergency procedure within the building, the mall, the store, or any other place during an emergency condition, where the information will help navigate the user to safety.

[00473] Panic portion of NAV4emergency allows the user to transmit a signal requesting to be located in an emergency. The signal would include information pertaining to the user's location.

[00474] Regarding privacy, the system does not collect personal information, such as user's name or telephone number. It does, however, record the cellular telephone's Bluetooth identification number or other identifier to build a profile of the user or the use of the cellular telephone in the area. It is analogous to surfing the web where a user's Internet Protocol (IP) address is recorded for future marketing statistics and surfing habits (with permission from the user). Also as part of the encoding key into the Bluetooth device, such as the user's profile, as described above can be included to enhance privacy and security to the level where viewing the key broadcasted by the Bluetooth device doesn't reveal any user identification unless the user requests to be registered to receive incentives, specials, sales, and the like. Even then, the users name or other personal information is secure and only the Bluetooth device key or identification (ID) is recorded.

[00475] By directly targeting the consumer standing adjacent to or within a business, an event, or approaching a kiosk or restaurant, merchants can maximize their marketing budget while incorporating this new, inexpensive and effective form of advertising.

[00476] The user is in complete control. The user can disable their Bluetooth application at any time or just reject content. The system avoids spam and the user is attracted by incentives rather than generic promotions. In a mall-like environment an incentive to a user to use the disclosed technology can be further enhanced with the use of the associated key advantages and packages.

[00477] Isn't this all a bit like big brother? Not at all, and it isn't even little brother! The system simply logs the movement of a cellular telephone around an area and aggregates this to provide trend data for businesses. The process is much less intrusive or invasive than existing methods that are already in widespread use. For instance, Closed-circuit television (CCTV) cameras and number plate monitoring collect personal information such as your image or car number plate. The disclosed technology represents the next generation shopping experience in shopping centers, malls, or stores and fits very well with today's business model. Such a service

can be offered for free to the users and would be backed by advertising and the use of the data by the stores.

[00478] Who benefits from the disclosed technology? Everyone benefits from the trend data collected. The process enables a way to collect instant feedback from shoppers without having to bother them for information. In the old days, centers would have used researchers to survey consumers, but this information takes time to collate and response rates are very low these days, as shoppers have increasingly become reluctant to stop and share their feedback. Hence the disclosed innovation provides a very effective method in the same way that television (TV) networks know how many people watched particular programs and use that information to discern what programs to produce and how to calculate the costs advertisers must pay to promote their products during different timeslots. The system provides the equivalent for shopping center operators and their resident retailers. It is believed that introducing the proposed system and marketing tools described above can help users and merchants upgrade the real shopping experience of today with the advantage of the web like tools.

[00479] The disclosed innovation represents the next generation shopping experience in shopping centers and malls and fits very well within today's business model. Such a service can be offered for free to the users and backed by advertising and the use of the data by the stores. Such service, applications and the ability to include, the emergency functions will also ease the fear of locating a user or any privacy issue.

[00480] For the first time the shopper will experience Internet type marketing in the traditional sales and advertising venue.

[00481] Here are the benefits consumers could see from a shopping center using the disclosed technology:

Better in-mall events. The system can monitor how successful previous events were by monitoring the sheer volumes of people attending and for how long each person attends the event.

Provides shoppers with next generation sales tools, including navigation within the mall, the store, or another facility, wherein the navigation can include instructions to guide the user directly to sales or specials that the merchant want the user to go to.

A supplement or replacement to the store or mall directory as well as the in-store or mall marketing flyer.

Take the guessing away from understanding what the customer wants, and then send them directly to the location containing the products, the coupons, or the specials the customer might want.

Improves public transport links by monitoring how people traveled to a center. With the government's current emphasis on helping people to use public transport more effectively, having this kind of information can have a very positive, local environmental impact. Busy shopping centers can otherwise create large volumes of extra road traffic, also with the Search4Parking and Return2Parking applications improves traffic and reduces time and gas consumption.

Eliminates congestion within the shopping center, as the disclosed innovation can help the shopping center management understand whether opening hours need to be extended or whether the center layout needs to be improved to avoid congestion.

Improves shopping center and public facilities efficiently, as the disclosed innovation's data helps managers understand which parts of their facility are very busy. This knowledge can provide guidance so the managers know when to deploy extra employees, cleaners, security personnel, and the like to ensure proper service.

Better security, where overcrowding within a shopping facility leaves shoppers vulnerable to pickpockets and other security risks. The disclosed system can identify congested areas and ensure security personnel are deployed appropriately.

In an emergency, the disclosed system can provide instant alarms and notification, even if the cellular communication network or other system is not available.

Improved mix of stores and center layout can result from the system helping identify which stores are popular and which are not; making sure that the best possible layout and mixture of shops is provided for visiting shoppers. If some shops are unpopular they can be replaced with brands that customers actually want.

[00482] It is believed that shopping should be an enjoyable pastime. Who wants to go to shopping center that are congested, poorly laid out, have dirty toilets, are badly positioned for transport links and which pose a security threat to visitors? All together, this makes for a much better shopping experience.

[00483] How do shopping center owners and retailers benefit? The benefits for shopping center owners of using the disclosed technology are huge, as there are many possible uses for the information gathered. The disclosed applications can help shopping center owners or operators get a better understanding of how people use their center, such as the order of stores the shoppers visit and the time the shoppers spend in different areas of the shopping center.

[00484] These days, visits to shopping malls are falling with increased competition from supermarkets, retail parks, and the Internet. With a decrease in visit frequency, it is critical that the shopper's experience at the mall is exceptional and that is where the disclosed applications come in. The information can assist malls at all levels; from the very mundane to the more strategic questions that they face, such as whether or not the shopping mall has the right mix of retailers.

[00485] Similarly the disclosed technology could help museums identify their most popular exhibits and help exhibition companies plan their venues more carefully around visitor traffic flows.

[00486] The disclosed technology is able to provide a solution with quantitative feedback on whether the changes management makes in the mall are successful. One of the ways to do this is by simply looking at how long shoppers tend to stay within a mall.

[00487] Don't retailers already measure shopper numbers? Yes they have infrared cameras and counting machines, which monitor and count the numbers of visitors to their stores. This measure is known as footfall and has been used by retailers for many years. The disclosed

system provides another level of data by looking at the aggregate paths that mobile telephone carrying visitors take and the length of time they spend in each location, which is commonly known as dwell time.

[00488] In the past, malls have focused solely on looking at the numbers of shoppers that they are drawing through the doors (footfall) but when combined with dwell time they can get a much more accurate predictor of their performance.

[00489] The system has no idea who the user is an individual. The system only looks at the path the user's cellular telephone or other mobile device takes. Essentially, it's like looking at a dot moving around a screen. In isolation this information isn't too interesting until you look at the wider patterns and trends and see lots of dots taking the same route or visiting the same areas of the mall.

[00490] What is the Bluetooth identification (ID) number? A Bluetooth identification (ID) is like the Internet Protocol (IP) number in a computer network or the Internet which does not contain or reveal the user's telephone number that the cellular network operator uses to identify your telephone. The disclosed system utilized the identification (ID) information as one key to find and detect the user.

[00491] The linkage between this identifier and your personal information is very critical to the business owner as it can provides a user's habits, preferences, and when available, a user's profile. The disclosed system provides a new breed of tools to the business owner or operator just by getting to know where the user is, and at the same time the system provides the user with the best VIP-like personalize shopping services.

[00492] The disclosed applications do not detect or acquire any personal information and have absolutely no idea who the user is as an individual. Although the applications include an option for users to register as mall or store customers to provide more details about the user (still no real ID), the process would be analogous to a membership card that will provide the user with incentives, coupons, or special discounts if the user participates. Moreover recent emergency events prove the need for emergency and notification to the right people at the right time, by keeping the key identification (ID) of the Bluetooth devices that are in the area or facility. For

example, the disclosed NAV4emergency feature can provide instant alarming and notification and navigation to the exit route and to safety. Again, all of this can be accomplished without revealing the user's identity (ID) or breaching privacy of the users.

[00493] The business model referred to as Next Generation Marketing is analogous to web advertising and the main focus of search engine success, which is based on technology that tracks the web user's habits and provides the user with ads related to the user's interests.

[00494] Using the disclosed infrastructure of Bluetooth enabled RF tags or beacons, wherein the beacons are deployed about in a mall, a store or a shopping center environment. The disclosed invention represents a very unique ability to bring a web like shopping experience by its ability to acquire and store the user's surfing or shopping habits in the shopping center, the mall, or the store. The disclosed invention will provide a better shopping experience (coupons, specials sales, according to the user's shopping habits) and service to the shopper.

[00495] It is believed that introducing the disclosed system and the associated marketing tools above can help the users and the sellers to enhance the current shopping experience by introducing an advantage of the web like tools.

[00496] The disclosed innovation provides valuable solutions that enhance the effectiveness of advertising campaigns. The ability to optimize performance in real time has a positive effect on advertiser's satisfaction. The fact that this service is well integrated into the disclosed system is a tremendous advantage.

[00497] The disclosed innovation is a performance enhancing technology, providing great data and allowing improved customer service.

[00498] The disclosed innovation can provide an extremely effective way to optimize the performance of offline or online advertising campaigns in the mall or store environment. For excellence in client services, the idea is a clear win-win for everyone.

[00499] Helping to understand where users are going in the mall or store in real life and the shoppers' buying behavior patterns will allow the merchants to continually adjust offers, placements and creative content to improve buying through and maximize sales.

[00500] The disclosed technology will evolve mobile content into a bonfire revenue center that will benefit the shopping mall operator and merchants alike.

[00501] The user is in complete control. The user can disable their Bluetooth application at any time or just reject content. There is no spam and the user is attracted by incentives rather than generic promotions. Probably the best technical analogy would be to compare the disclosed technology with existing web-based systems that measure viewers of web sites, for example **GOOGLE ANALYTICS**.

[00502] For example, the Bluetooth enabled RF tag or beacon can broadcast an RF signal that includes its position coordinates, such as latitude, longitude, which can be detected by a Bluetooth enabled mobile device. The position coordinates can provide a third location accuracy for the current location of the mobile device by virtue of the mobile device adopting the position coordinates of the beacon as its own position coordinates.

[00503] The system use and costs should scale well with its ability for multi-use in an emergency and in a non-emergency to provide local navigation on malls, stores, campuses, buildings, hospitals, hotels, and the like, using the Bluetooth enabled RF tag or beacon for navigation. Some of the key applications are:

[00504] NAV4Mall, NAV4Store, NAV4Sale, or just University or Building Navigator, explore the indoor environment. These features navigate the user to the right place, the store, or the department the user is looking for. These features provide navigation using the mall map or store mapping to find the user's way around. This is accomplished by using the user's cellular telephone or other navigation system without assistance from the Global Positioning System (GPS). A new kind of service and new marketing way for the malls or store business owners, an add-on to local advertising.

[00505] With an indoor navigation based on the local map or mall layout that will provide the user with navigation to the user's desired location in the mall or store and receives content according to the user's preferences or habits. The user can be directed to a store, the product, the isle inside the store containing the desired product, and the like. The disclosed system provides a new marketing tool to the store or mall owner or operator to provide the customer with a new

service. The store can have also an option to deliver more content, including advertising, sale information, coupons, promotions, and the like to the user when the user approaches the store or already is inside the store. The information would be provided by way of Bluetooth or an Internet push to the user's Bluetooth enabled cellular telephone or mobile device. In an emergency, the NAV4emergency will kick in. The NAV4store or NAV4mall module is the one that is described in more detail above.

[00506] NAV4Museum, NAV4Conference, NAV4Show explore museums, conferences, shows, or exhibits in a new unique and easy way for the user to find their way around when navigating on the floor map of the museum, the conference, or the show. The indoor navigation provides navigation to exhibits, restaurants, cafes, lavatories, and the like within the venues. Any museum, conference, or show provides mapping of the exhibits to the attending user. Some provide venues can also provide an audio device, such as a headset, to get more information on the exhibits. The disclosed innovation will provide a unique indoor tool that will allow the attending user to navigate the museum, the conference, or the show in an easy way directly to the user's Bluetooth enabled cellular telephone. When the user reaches their desired exhibit, the user will be allowed to download information about the exhibits directly to their cellular telephone and/or Bluetooth headset. The NAV4emergency feature would also be adapted for use in these venues.

[00507] For users of a mass transportation system, the disclosed innovation can allow, locate, and point the user to the exact station or location on a route, providing an easy way to navigate the user to or within the train, about the subway, and about any other underground kind of system. The disclosed system provides a new way of subway or bus mapping, including indoor and/or outdoor environments; directly to the user's navigation device or cellular telephone. Every day millions of people are using the mass transportation system, trains, subways, buses, and the like. Each of the passengers depends on the transportation map for the route information, schedules, and additional services provided by the transportation system. Most of today's passengers carry a cellular telephone with them.

[00508] The disclosed methods can be used by the management of the transportation system, train, buses, taxi and road management where the RF tags or beacons can be installed in any

transportation facility or entity. The disclosed method can provide traffic and on-demand transportation requests. The disclosed method can provide online, real time traffic and transportation head count of the mobile devices existing in the local area according to an association with a proximity to the RF tags or beacons installed in the transportation entity, in association with transportation infrastructure. The disclosed method can provide information pertaining to parking, traffic conditions, signs, schedules and time to station. The disclosed method can determine how many people are at the station, the bus stop, or at any other congregating area to create an on-demand service for taxi and/or public services.

[00509] Aside from such data gathering and the importance of such statistically information to manage the flow of transportation in a local area, the RF tags or beacons serve as sensors to detect the traffic in a specific area. The status can be monitored by collecting how many mobile devices are in the specific area. In event of emergency, the disclosed system can provide emergency notification and alarming the local mobile devices.

[00510] The disclosed method can be used to manage transportation and provide automatic awareness to transportation management and/or operators as well as the user on the road. The user can automatically get information about traffic in their area generated from other associates. The user's cellular telephone identification (ID) and/or the car using the VIN broadcasting method can be employed as an RF tag or beacon. RF tags or beacons can be installed along a roadway, automatically generating traffic information by tracking the existence of users in the area and proximity to the RF tags or beacons installed along the road, within a transportation facility, at an intersection, and the like. Infrastructure of wireless RF tags or beacons benefit transportation industry managements by providing automatic crowd sourcing data from users along the road by acquiring the user's identification (ID) and determining their proximity to fixed RF tags or beacons. This collected data can be presented as a statistically view as data guttering for events like traffic on the road automatically. Adding such technology and infrastructure into the roads may take time, so the use of the driver and passenger or the pedestrian cellular telephone as a beacon and as automatic traffic notification can provide instant infrastructure, providing an immediate dynamic deployment for the benefit of the transportation network and the drivers. Mobile devices of the driver, the passenger, and/or the car can be utilized as a, RF tag or beacon and become a part of the automatic transportation system to alert

for traffic and road safety conditions. The process can provide automatic car to car notification of traffic conditions and road information.

[00511] The disclosed innovation provides a passenger with the navigation inside the transportation system directly to the passenger's Bluetooth enabled cellular telephone or mobile device. The passenger will know the exact location or station along the transportation route as well as additional information, such as transportation schedules. The disclosed process provides a new add-on service to for transportation providers and passengers alike, utilizing the disclosed indoor navigation methods. In an emergency, the NAV4emergency would also be available.

[00512] The disclosed idea of implementing RF tags or beacons along the roads and within transportation facilities is designed to reduce the growing congestion on the roads. By providing tools to create an intelligent transportation system, the implementation of beacons can be part of a car, installed in red lights, along the road or within the transportation facility, such a system can be installed along a bus route, in a bus station, in a subway, or in any other transportation entity, wherein the system provides real time, online reports, including a status if the transportation systems are empty or filled with travelers. The system can provide an automatic response from the user's or car's mobile device associated with the RF tags or beacons installed in the bus station or train station. The information will allow transportation control that can replace what is currently being used, which requires installation and support of high cost camera and/or sensors. In an alternative solution used today, traffic monitoring relies upon manually collect information from users, which employ the Global Positioning System (GPS) to acquire their locations and movements. It is noted that the Global Positioning System (GPS) is not available for indoor environments or provides accurate information. In a simple explanation, the user mobile telephone automatically transmits their beacon identification (ID). More of the same beacon identification (ID) reported in the same area is understood to be a traffic condition or slow moving head count of cars, travelers, or the like in the transportation facility or the entity area. In a way, the disclosed method provides an automatic waze system. Such a system can replace exiting sensors and provides the user and/or the transportation management with the ability to know exactly where the bus, the train, the subway are at any point in time. The data can used for the schedule or on-demand public transportation, like sending a bus or taxi to an area according to the demand in the area. Such a method can provide the user traffic and transportation

information where the user plays a big part of the process and the process is not dependent upon a manual transfer of information, which has been proven to be not accurate enough.

[00513] One application creates an echo system where the drivers of cars and the transportation entity are all integrated for an intelligent transportation system of tomorrow and all based on the same concept of infrastructure on RF tags or beacons used to collect information to generate statics. Alternatively or in addition to the infrastructure, the system can employ dynamic beacons where the user's mobile device or cellular telephone as well as the navigation components within the car are integrated part of such system. It is understood that a mobile device or any other Bluetooth enabled device, such as a desktop computer, a laptop computer, a portable computing tablet, cars, and the like can become a beacon providing a new echo system, where an infrastructure can include both static (fixed) and dynamic (moving) deployments of beacons which interact with each other. Again, deploying such technology and fixed infrastructure into the roads may take time, so the use of the driver, the passenger, or the pedestrian cellular telephones or mobile devices as an RF tag or beacon and as automatic traffic notification can provide instant infrastructure. This would provide an immediate dynamic deployment for the benefit of the transportation as well as the drivers.

[00514] The disclosed system provides the next cellular telephone or mobile device killer application. Emerging technology markets are always on the lookout for that elusive killer application, the precious, irrefutable application that makes adopters stand up, take notice, and open their wallets. Once it's found, and as soon as adopters realize firsthand, the value to be achieved, that killer application eventually expands into other, more advanced areas of adoption and innovation.

[00515] Hotel resort and cruise ship: A good example of use can be referred to as Nav4Hotel, Nav4Resort, or Nav4Cruise ship. The proposed system and infrastructure can include a series of installed RF tags or beacons in such places as cruise ships, hotels, resorts, and other hospitality facilities to benefit the hospitality business and the guest.

[00516] The subject invention creates infrastructure of RF tags or beacons in the facility, the hotel, the resort, and the cruise ship areas. The infrastructure of RF tags or beacons would be

integrated with an existing hospitality system and provide a trigger mechanism when the existence of the traveler or guest is detected.

[00517] The association between the guest's mobile device or cellular telephone or the hospitality employee mobile device or cellular telephone and the RF tags or beacons will allow the example option below. As such, there are two parts for the system to work: (a) the infrastructure of the RF tags or beacons installed in the hotel, the resort or the cruise ship, and (b) the guest's or employee's Bluetooth and/or Wi-Fi enabled mobile device or cellular telephone in conjunction with the associated application. Again, it is noted that the system can work without Internet access and/or cellular communication and can utilize an existing Wi-Fi based system in conjunction with local servers.

[00518] Example of some of the benefits and functionality to the hospitality system are:

Automatic check-in.

Automatic or manual interface to the front office system.

Automatic or manual interaction with a billing folio.

Link to a key system or replacing a room key.

Recognize when a guest is within the room, enabling automatic actions, such as turning on an air conditioning and/or a light as well as recognizing when a guest leaves the room and automatically turns off the air conditioning and/or lights to save electricity.

Hotel resort cruise ship navigation.

Allow local messaging without Internet and/or cellular communication based on local chat. This is particularly applicable for cruise ships.

Allow push messaging to the guests using the Location Based Services (LBS) or by remote, when Internet access is available.

Replace and provide an add-on service to a guest in-room package, which can include an area guide, deals, and coupons.

Option of VIP services where the guest can be recognized automatically around the hotel, the resort, and the cruise ship using their profile preferences just by being detected as being in the area. The hospitality service organization can provide personal treatment and services based upon the detection of the user within the area.

A guest's room can be identified as being occupied or vacant, wherein housekeeping can be notified to clean the room when the room is vacant.

Housekeeping management room status attended worksheet and productivity report.

Increase security to the guest and to the hotel resort.

Allow the creation of a profile preference of the guest's group.

Provide a check-in capability to a restaurant interface, to a POS system bar system, and acquire menu selections.

Provide automatic ticketing and seat selection.

Support guest loyalty and membership program incentives.

Increase security and provide add on to the security plan of the hotel, resort, and cruise ship to be part of the emergency evacuation and emergency procedure.

[00519] It is believed that the disclosed invention will meet the desire of hospitality service providers to increase their average revenue per user.

[00520] The main object of the present invention is to provide the indoor guide navigation and a special application for indoor use without the need for any Global Positioning System (GPS) communication.

[00521] It another object of the present invention to provide a method of providing special indoor application using Bluetooth and/or Wi-Fi enabled RF tags or beacons in conjunction with Bluetooth enabled devices, especially the cellular telephone.

[00522] It is another object of the present invention to provide a method using a special application for local business, malls, departments stores, regular stores, buildings, downtown centers, or any other facility area; especially, but not limited to, indoor environments. The application triggers activities based upon the identification (ID) of detected RF tags or beacons located in the area.

[00523] It is another object of the present invention to provide a marketing method, especially, but not limited for, the Location Based Services (LBS) market.

[00524] The foregoing and other objects of the present invention are achieved by providing an infrastructure of Bluetooth enabled tags or beacons installed in known locations within the area or facility. Each RF tag or beacon is assigned its own unique identification (ID) to identify the location in the area. The RF tags or beacons broadcast the identification (ID) to be pickup by the Bluetooth enabled cellular telephone or mobile device.

[00525] An indoor mapping or mapping images of the area or facility will be part of the application and can be downloaded before arriving to the area or facility or triggered to be automatically download when the user approaches or is within the area.

[00526] The application on the cellular telephone or other Bluetooth enabled device will scan the area or facility for the beacon signal emitted from the RF tags or beacons, wherein the beacon signal includes the identification (ID) or name. When a Bluetooth enabled tag or beacon identification (ID) matches one on a list, the user's mobile device responds to the proximity detection and determines a signal strength that may be used to calculate a distance. When more than one beacon signal is received, the application can complete a simple triangulation algorithm to determine the current location of the mobile device. Other Bluetooth devices that are not on the list would be filtered out.

[00527] One the location of the mobile device is established, the location can be displayed on the map. And because the location of the other RF tags or beacons are known, navigation between the current location and a desired RF tag or beacon that represents a waypoint is easy to achieve. In reality, no communication is established between the RF tags or beacons and the cellular telephone or other mobile device.

[00528] The disclosed innovation reverses the current idea of locating the user by letting the user navigate according to the beacon signals transmitted by the Bluetooth enabled tags or beacons, wherein the beacon signals are sent by way points directly to the user's mobile device. This will enable Location Based Services (LBS) navigation, even indoors without use of the Global Positioning System (GPS) or the cellular communication network. The disclosed invention can also be adapted to enable triggering of applications and/or create a link to an existing system and software.

[00529] The RF tags or beacons can reach from long distance depending on the application and the antenna used by the RF tag or beacon. To get more accuracy, less range and more beacons may needed to achieve an accuracy of 10 meter or less, which provides a more than sufficient accuracy for navigation within a building, a room, or any other indoor environment. Getting more range to the "box" is as simple as attaching a bigger antenna or including a power buster to increase the signal.

[00530] The user can choose to be registered, which would provide membership privileges, identify the registrant as a student in a university, a school, or an employee in a business. This provides advantages, especially for receiving direct incentives, specials, coupons, and the like. Additionally, the registration would provide benefits associated with a full NAV4emergency protection.

[00531] The disclosed applications lets the user choose to participate and receive incentives, specials, sales, coupons and local content tailored towards the user's preferences, all for free. Alternatively, the user can choose not to participate and pay a small fee for the service and the software. In any case the user's privacy remains protected to the highest level compared to any normal daily use of the Internet.

[00532] There is also a great benefit to the user participating, as the user can have full emergency notification directly to the user's telephone. In an emergency the user can be directed within the area, building, mall, or store and provide navigation to the user along an exit route in accordance with the emergency procedure. This feature will be available to the user even if the cellular network fails due to power outages or the high volume of network traffic which commonly occurs during an emergency situation.

[00533] In the disclosed method, there is no detector or tracking for the user, the user themselves engages the scanning and detecting method to find the RF tags or beacons in the area using the user's mobile device with the proximity scan of local RF tags or beacons providing the triggering mechanism.

[00534] In summary, the proposed solutions provide a full suite of applications for the benefit of the user, from parking, to sales, specials, indoor navigation, general informed, and notification in an emergency condition and directed to the exit route to safety.

[00535] The disclosed method can be attractive not only for shopping malls, department stores, or downtown strips, but also to high-rise buildings, commercial buildings, universities, schools, museums, amusements parks, trains, subways, and hotels. It can also be attractive to search engines, advertising companies, cellular telephone operators, manufactures, Global Positioning System (GPS) companies, mapping, local businesses, local advertising, Location Based Services (LBS), and the like. The disclosed method can give the Location Based Services (LBS) a new meaning; a business model that's made easy.

[00536] A facet of behavioral targeting has been around for a while but mostly online but it's been gaining traction among advertising agencies retargeting program, which is now a key planning consideration for advertisers.

[00537] Why? The primary reason is because retargeting is a powerful means to bring lift to advertising campaign results, generating higher conversion rates and lowering acquisition costs. You can't be much more effective advertising than advertising that targets a person who has shown an interest in a product but didn't buy with a related advertising that then gets him to buy, right? It generally fails to tap the unique opportunities of local advertising market estimates to be over \$150 Billion in US alone, although people are spending more than 90% of their time indoors, there is no clear technology to provide indoor navigation and not a clear business model. Advertisers and the business are disillusioned with the promise of Location Based Services (LBS), but are still longing for a solution that properly addresses the significant audience represented by the explosion of cellular telephones use and the availability of content.

[00538] It is understood that the disclosed innovation technology and business model can provide the next generation method for the Location Based Services (LBS) market to tap into the huge market opportunities.

[00539] The disclosed methods represent a very unique way of locating the exact location of the user (through the mobile device). In the disclosed method, the user scans the area for a known list of RF tags or beacons. The user controls the scanning of the area for the known identification (ID) types of RF tags or beacons. In reality, bi-directional communication or pairing does not need to be established between the user and the RF tags or beacons. The user's mobile device scans the area for a known RF tags or beacons and the process of determining the location of the mobile device is accomplished using the identification (ID) of the RF tag or beacon and signal strength thereof to determine a the proximity to the RF tag or beacon. This process provides an accuracy of less than 5 meter.

[00540] Added to the navigation feature is a special indoor application designed especially for indoor environments, stores, mall shoppers including features, such as finding where the user parked their car, finding or search of directory, or receiving an emergency alarming and notification.

[00541] Moreover this innovation is not dependant upon cellular communications or the Internet for the method of detecting the RF tags or beacons and there is no need for a central system or expensive infrastructure. In fact, the user's mobile device or cellular telephone as well as deployed RF tags or beacons creating the infrastructure each has at least one battery built in and can work even if the electricity in the area is out, which is very important in emergency situations.

[00542] Moreover the sale sense marketing method comprises a unique way of delivering local content, advertising, coupons, special sales etc. pin point according to the user's identity (ID) and or profile preference that can be a record of behavioral activity and will provide simple and secure method for targeting user for Location Based Services (LBS) and other services replacing like Near Field Communication (NFC) for marketing and even payments transactions.

[00543] The disclosed innovation provides a full line of indoor navigation application especially to places or areas that are either indoors or outdoors.

[00544] An indoor navigation system may include a navigation computer and an arrival detection system. The navigation computer may be configured to receive a destination to which a user of the mobile navigation system wishes to travel and to provide guidance to the user about how to navigate to the destination. The arrival detection system may be configured to automatically detect when the mobile navigation system has arrived at the destination by being in a proximity to an RF tag or beacon identification (ID) in the local area. The detection system is based on a sense or scan of the existence of RF tags or beacons installed in the local area and would be configured to wirelessly automatically transmit an arrival notice indicating when the user detects the existence of an RF tag or beacon in the proximity thereof, thus determining that the user has arrived at the destination in response to a detection of the user in the area by the detection system based upon the arrival of the mobile navigation system at the destination.

[00545] The mobile navigation system may be part of a cellular telephone or any navigation device using a Bluetooth function. Part of the detection application is a notification system configured to wirelessly transmit the RF tag or beacon identification (ID) of the RF tag or beacon in the vicinity and to associate the mobile device's identification (ID) of the user to determine the exact location of the user. This enables any of a variety of functions.

[00546] In one example, the check in process provides an arrival notice to a representative of an airline. The arrival notice may be configured to automatically check the user into a flight of the airline.

[00547] In a second example, the system may be configured to wirelessly transmit the arrival notice to a representative of a hotel. The arrival notice may be configured to automatically check the user into the hotel.

[00548] In another example, the system may be configured to wirelessly transmit the arrival notice to a representative of a food service.

[00549] In yet another example, the arrival notice may be configured to trigger payment for merchandise or a service.

[00550] In yet another example, the arrival notice may be configured to trigger the delivery of merchandise or a service to a vehicle in which the user is traveling. The arrival notice may include information about the location of the vehicle.

[00551] In yet another example, the arrival notice may be configured to trigger delivery of promotional items to the user, wherein the promotional items can be relating to an establishment at or near the destination.

[00552] In yet another example, the system may be configured to wirelessly transmit the arrival notice to a representative of a conference that has been scheduled to take place at the destination.

[00553] In yet another example, the system may be configured to wirelessly transmit the arrival notice to multiple recipients. The multiple recipients may include attendees of a conference that has been scheduled to take place at the destination.

[00554] In yet another example, the system may be configured to wirelessly transmit the arrival notice to a localized social networking site in a fashion that causes notice of the arrival of the user to be published by the localized social networking site.

[00555] To ensure privacy, the system may be configured to ask the user for permission to transmit the arrival notice.

[00556] In yet another example, the system may be configured to automatically transmit the arrival notice upon detection by the arrival detection system of the arrival of the mobile navigation system at the destination.

[00557] At the time the navigation computer receives the destination to which the user wishes to travel, the system may be configured to ask the user whether the user wants the arrival notice to be transmitted in response to detection by the arrival detection system of the arrival of the mobile navigation system at the destination.

[00558] The system may include a global user setting which a user may set to automatically transmit or not transmit arrival notices in response to detection by the arrival detection system of the arrival of the mobile navigation system at destinations.

[00559] The system may be configured to ask the user to where it should transmit the arrival notice, to receive information indicative of this requested location from the user, and to transmit the arrival notice to this location.

[00560] The system can create and utilize a network, which is referred to as dynamic deployment. The system will use the built in, Bluetooth protocol stack module that is able to simultaneously interconnect with other local devices, such as portable cellular telephones in a "piconet", over the local area. The simultaneous connectivity limit of eight (8) devices at a time is overturned by the ability of creating a plurality of piconets which operate in a close proximity. It is understood that the Bluetooth enabled devices, such as portable cellular telephones, can rapidly move from one piconet to another. In fact, the Bluetooth devices only need to remain a member of one piconet for the period of time required to complete one communication transaction. So the Bluetooth enabled devices can join and leave a local piconet frequently, effectively overcoming the eight (8) device limit. It is noted, even without the option to use a long range Bluetooth antenna; the configuration can effectively reach an unlimited distance.

[00561] The proposed invention provides an ability to form a wireless ad hoc Bluetooth network or networks based on a collection of Bluetooth enabled mobile devices that dynamically form a temporary network, as long as these device are within a sufficient range of one another, such as inside a room, inside a building, along a road, inside a store or inside mall. The flexibility of the ad hoc network is what makes it a suitable choice for emergency deployment scenarios, where multiple devices would be deployed in a proximity area that is designated as an emergency. The ad hoc network provides a new way of distributing emergency and alert information directly to those in the needed area.

[00562] Moreover, based upon normal human behavior, there is no need to inform everyone in a full room, or requiring all of the proximity devices participating in the network to be informed (for example in emergency). If only a few people within the occupied room are informed or receive the emergency information on their portable cell telephone, they will convey the information to others located in the area.

[00563] The same method and idea is mimicked by the concept of dynamic deployment. The concept can be paralleled as a new way to deliver critical emergency alarming and notification without infrastructure in the localized area.

[00564] Moreover, the limitation of Bluetooth coverage can be overcome by utilizing the capabilities of the Bluetooth protocol in the methods described above. For example, in a very large conference location, the localized Bluetooth network (piconet) can join each other and form a larger network that covers the entire facility, which is much larger than the limited coverage of a single Bluetooth device. Portable cellular telephones located at one end of the facility can communicate with a second Bluetooth enabled device located at the opposite end, where the communication traffic is relayed by one or more intermediary, bridging devices. Any Bluetooth enabled device, such as the exemplary Bluetooth enabled cellular telephones, can become the bridging device(s). The cellular telephone user does not need to know whether their device is acting as a bridging device, as the process is established and functions automatically as part of the Bluetooth protocol stack routine. In effect, the process does not change any internal behavior of the Bluetooth.

[00565] And again, there is no need to reach all the people with an emergency or other message. If the message were conveyed to only a few in a room, at least a portion of those would inform the remaining people of the emergency message.

[00566] Moreover, the present innovation will allow the user to use a local, instant emergency messaging system. The dynamic deployment configuration provides the ability for people to communicate with one another in the same local proximity using Bluetooth enabled devices, where the people can chat and exchange important messaging for free. This would be accomplished exclusive of a need for a cellular network. Just think, what can be done in an emergency or in an army deployment as other communication method.

[00567] From the old days in history, humans used messengers to deliver news and information. The disclosed invention uses applies these older concepts to a device that will make it easy to distribute and broadcast the information around, using the messengers as the mobile (emergency) notification, as referred to as dynamic deployment.

[00568] These, as well as other components, steps, features, objects, benefits, and advantages, will now become clear from a review of the following detailed description of illustrative embodiments, the accompanying drawings, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[00569] The preferred embodiments of the invention will hereinafter be described in conjunction with the appended drawings provided to illustrate and not to limit the invention, in which:

[00570] FIG. 1 presents a schematic diagram representative of an exemplary infrastructure deploying a series of Radio Frequency (RF) tags or beacons;

[00571] FIG. 2 presents a schematic diagram representative of an exemplary indoor mapping system utilizing the Radio Frequency (RF) tags or beacons, wherein the diagram depicts an exemplary application within a shopping mall environment;

[00572] FIG. 3 presents a schematic diagram illustrating basic exemplary functions of an indoor mapping application as used on a mobile device or cellular telephone;

[00573] FIG. 4 presents an exemplary flow diagram representative of an indoor Radio Frequency (RF) tag or beacon detection and an associated navigation process;

[00574] FIG. 5 presents an exemplary series a gradient concentric circles indicative of a location;

[00575] FIG. 6 presents an exemplary flow diagram representative of a business based application utilizing a series of deployed Radio Frequency (RF) tags or beacons;

[00576] FIG. 7 presents an exemplary flow diagram representative of a marketing based application utilizing a series of deployed Radio Frequency (RF) tags or beacons, wherein the marketing based application utilizes a profile, preferences, and other information for sales and marketing purposes;

[00577] FIG. 8 presents an exemplary schematic diagram representative of a series of functions or applications associated with a series of deployed Radio Frequency (RF) tags or beacons, wherein the series of functions or applications are generally directed for use with an Radio Frequency (RF) tag or beacon infrastructure deployed within an indoor environment.

[00578] FIG. 9 presents an exemplary schematic diagram illustrating an infrastructure employing Radio Frequency (RF) tags or beacons deployed within the indoor environment;

[00579] FIG. 10 presents an exemplary schematic diagram representative of a series of functions or applications associated with transportation and/or telematics applications, wherein the series of functions or applications are generally directed for use with a static and/or dynamic Radio Frequency (RF) tag or beacon infrastructure;

[00580] FIG. 11 presents an exemplary schematic diagram representative of a series of functions or applications associated with hospitality based applications, wherein the series of functions or applications are generally directed for use with hospitality related businesses and environments;

[00581] FIG. 12 presents an exemplary flow diagram representative of a next generation marketing tools employing Radio Frequency (RF) tag or beacon technology; and

[00582] FIG. 13 presents a schematic diagram illustrating an exemplary dynamic deployment of an RF based network for use in a variety of applications, including mobile to mobile communications, car to car communications, and emergency or local communications.

[00583] Like reference numerals refer to like parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[00584] In all the figures of the drawings, subfeatures and integral parts that correspond to one another bear the same reference symbol.

[00585] Referring now to the drawings in detail and first particularly to FIGS. 1-13 thereof.

[00586] An exemplary flowchart illustrating a use of Radio Frequency (RF) tags or beacons 102 is presented in FIG. 1. The Radio Frequency (RF) tags or beacons 102 can utilize at least one of Bluetooth and Wi-Fi signal protocols. The exemplary system utilizes a mobile cellular telephone or other suitable mobile device 101 to scan and detect a proximity of an installed Radio Frequency (RF) tag or beacon 102 in the most part for determining a location of the user, assumed to be the same location as the user's cellular telephone 101 in an indoor environment or an outdoor environment. The location is determined by identifying the installed Radio Frequency (RF) tag or beacon 102 in the vicinity of the user's cellular telephone 101, and then using the known location of the respective Radio Frequency (RF) tag or beacon 102 thereby. The proximity of the Radio Frequency (RF) tag or beacon 102 can be used for initiating or triggering a notification of an existence to an indoor and/or outdoor navigation process as well as delivery of local content. All of this would be accomplished according to the determined location. The same method can be used by fixed computers or portable computers 103, portable devices 104, pedestrians carrying a portable device 105 (such as a cellular telephone), or a vehicle / car 106 that can be equipped with RF Bluetooth or Wi-Fi technology. It is noted that the static beacons 102 can be assisted by including other portable RF Bluetooth or Wi-Fi enabled devices within the network, thus creating a dynamic network. It is understood that a number of applications can be provided utilizing the infrastructure created by the series of deployed beacons. Additionally, the applications can utilize a precise location of the user, wherein the location is determined by information provided by beacons signals emitted from each of the deployed RF beacons 102.

[00587] An exemplary use of the Bluetooth and/or Wi-Fi enabled RF beacon infrastructure deployed in a mall environment is illustrated in FIG. 2. An indoor map 200 of the mall interior is downloaded and saved or installed on the cellular telephone 101. The indoor map 200 includes building structure layout, business locations and descriptions, and known RF tag or beacon 102 locations throughout the associated mall, building, or other facility. The RF tags or beacons 102 can be deployed inside stores or at any other Points of Interest (POI) located throughout or around the mall. Information associated with an RF tag or beacon 102 located proximate the cellular telephone 101 can be forwarded to the cellular telephone 101 by the beacon signal. The associated information 109 can be displayed upon the cellular telephone 101 as illustrated. A

location of the beacon signal receiving device, such as a cellular telephone 101), can be determined based upon a close proximity to one or more of the RF tags or beacons 102 of the series of deployed RF tags or beacons 102, which create the beacon infrastructure. The precise location of the receiving device 101 can be determined based upon an identified beacon identification (ID) and a signal strength from the detected RF tag or beacon 102102 or RF tags or beacons 102102. The precise location can then be displayed upon an indoor map 200, as shown in FIG. 9.

[00588] An exemplary operational process completed by the cellular telephone 101 is presented in FIG. 3. The mobile device 101 activates an application program for indoor mapping of the facility, building, structure, and the like 200 and scans a local area for RF tags or beacons 102 to determine the precise location 302 of the mobile telephone 101. The location of the mobile telephone 101 is determined by scanning the infrastructure of RF tags or beacons 102, wherein each RF tag or beacon 102 is installed in a known location within the structure, wherein the structure can be a mall, a building, any facility, or any other enclosed structure. The RF tags or beacons 102 102can be installed inside stores or at any specific Point of Information (POI), around the mall. The location of the cellular telephone 101 can be determined by using information from any RF tag or beacon 102102 located in a close proximity to the cellular telephone 101. The application would recognize the identification (ID) of the RF tag or beacon 102, wherein the identification (ID) is embedded within a beacon signal emitted by the proximate RF tag or beacon 102. The application would calculate the location of the cellular telephone 101 by utilizing a signal strength of the emitted and received beacon signal. This process provides a solution for a user to determine the user's location exclusive of the Global Positioning System (GPS), access to the Internet, or any other bi-directional communication. The location of the cellular telephone 101 is then displayed upon an indoor map 200 on a display on the cellular telephone 101. Should the cellular telephone 101 be located in a suitable area and comprise the ability to establish bi-directional communication, the cellular telephone 101 can transmit a notification signal or message indicating that the cellular telephone 101 is in a region proximate the RF tag or beacon 102102, such as by transmitting an "I am here" message to a predetermined recipient. This can provide an automatic check-in process, where the user notifies others of the user's local existence to the local area business to establish his local location. In turn; the system can forward local contents to the cellular telephone 101, wherein the local

content would be information associated with the current position or location of the cellular telephone or other mobile device 101. The system can be enhanced to utilize a direction of travel of the cellular telephone 101 and anticipate approaching RF tags or beacons 102. The system would then determine and transmit information associated with RF tags or beacons 102 located along the current projected path of travel of the cellular telephone 101.

[00589] An exemplary flowchart illustrating an indoor detection and navigation procedure is presented in FIG. 4. A user of the mobile cellular telephone 101 approaches a facility or area where the user can download the facility or area map 200 having a series of Bluetooth and/or Wi-Fi enabled RF tags or beacons 102 installed in known locations throughout the facility or area. The application installed on the cellular telephone 101 will scan the area or facility for broadcasted beacon signals. Upon receiving a broadcasted beacon signal, the application will determine if the received beacon signal is associated with any RF tags or beacons 102 included in a list of known RF tags or beacons 102102. If the signal is determined to be associated with any RF tags or beacons 102 included in the list of known RF tags or beacons 102102, then the application proceeds with a location determination process 303. The location of the user, assumed to be the location of the cellular telephone 101), is determined to be in a proximity of the identified RF tag or beacon 102102 transmitting the received beacon signal. The location is refined by using a signal strength of the beacon signal of the identified RF tag or beacon 102102enabling determination of a more precise indoor location of the cellular telephone 101. The location is then identified and displayed on an associated indoor map 200. In a condition where the cellular telephone 101 fails to receive a beacon signal, the cellular telephone 101 continues to scan the area (407). An optional feature includes a step of transmitting a notification of existence upon identification of a location; essentially having the cellular telephone 101 transmit a message stating "I am here" to the local area as a way of automatically check-in and/or a method of notifying a system that the user is within a local region. For example, the system can notify a local area business that a user is within the vicinity. In another example, the system can convey local contents to the cellular telephone 101 based upon receipt of the notification that the user is within the area. The system can provide the user with a navigation heading 305 to waypoints based upon the current location of the cellular telephone 101. In yet another example, the system can transmit Points Of Interest (POI) to the cellular telephone 101 as illustrated in FIG. 2.

[00590] Continuing to refer to FIG. 4, as the user with mobile cellular telephone 101 approaches a facility or area where the user can download the facility or area map 200 associated with the Bluetooth and/or Wi-Fi enabled RF tags or beacons 102 installed in the facility area in known locations. The application operating on the user's mobile cellular telephone 101 will scan the area or facility for RF tags or beacons 102 that are included on the list of known RF tags or beacons 102. If any RF tags or beacons 102 on the list were found, then a location determination process 303 is used to determine the location of the user using a proximity to the found and matched identification (ID) of the associated RF tag or beacon (102). The system uses the close proximity to the RF tag or beacon 102 and recognizes the beacon identification (ID) as well as calculating the beacon signal strength from the detected RF tags or beacons 102 to allow a process for determining the precise location of the mobile device 101 in an indoor environment and includes an ability to show the location over the indoor mapping (200). The scanning continues if RF tags or beacons 102 are not found 407. When a RF tag or beacon 102 on the list is found, the location is displayed on the map loaded onto the mobile cellular telephone 101 or any other Bluetooth device (103, 104, 105, 106). Part of the detection process can include a step to notify a recipient of the existence of the user, essentially stating: "I am here" (304) to the local area as a way of automatically checking in. The automatic check in method enables the user to automatically notify others of their local existence. The automatic check in method informs the local area business of the presence of the user's local location 303. In return, the system would provide local content to the user, according to the user's location or a navigation heading 305 between Points Of Interest (POI).

[00591] An exemplary RF beacon accuracy radius circle 501, introduced in FIG. 5, is utilized in at least two distinct manners: (a) the RF beacon accuracy radius circle 501 is used for the application, and (b) the RF beacon accuracy radius circle 501 is used to identify when the user's cellular telephone 101 enters and/or exits the area around and in a proximity to an RF tag or beacon 102 of the series of RF tags or beacons 102. A central circle 502 and an inner circle 503 illustrate different radii from the respective RF tag or beacon 102 presenting an accuracy of the location of the cellular telephone 101. The radius circle 501 would be illustrated as a circle overlaid on a portion of the local indoor map 200. This displayed configuration would identify an accurate location of the cellular telephone 101 relative to the proximity of the beacon signal

received from the Bluetooth and/or Wi-Fi RF beacon 102 located in the vicinity of the cellular telephone 101.

[00592] An exemplary flow diagram of a business application utilizing the series of RF beacons 102 deployed throughout a facility, one or more buildings, a mall, a store, and the like is presented in FIG. 6. Each RF tag or beacon 102 can be installed by the facility owner, a business owner or operator 601, an advertising company, and the like. In one application, a business owner or operator 601 would install an RF tag or beacon 102 in their business. When the user of the cellular telephone 101 approaches the RF tag or beacon 102, the cellular telephone 101 detects a beacon signal transmitted by RF tag or beacon 102 in the proximity thereof. The cellular telephone 101 receives the beacon signal and determines the identification of the RF tag or beacon 102 associated with the received signal. Once the location and/or identity of the RF tag or beacon 102 is known, the application initiates a procedure to obtain local content delivery 604 from the business and/or business owner. In one option, the system can provide business or location content 604 to the cellular telephone 101. In a second option, the cellular telephone 101 can transmit a signal that will directly or indirectly notify the business owner that the cellular telephone 101 is located proximate a specific beacon 102, wherein the specific beacon 102 is associated with the business owner's store, located either proximate to or within the business owner's store, and the like. In turn, the business owner can provide local content 604 to the cellular telephone 101. The application can display the location in any suitable format, such as the floating circle 501, upon the map 605.

[00593] A flow diagram illustrating an exemplary target marketing feature is presented in FIG. 7. The application uses a profile preference provided by the user's cellular telephone 101 wherein the mobile device or the user's cellular telephone 101 scans the local area and determines the location of the cellular telephone 101 using information obtained from a beacon signal broadcasted by the RF tag or beacon 102 in the vicinity of the mobile device 101, such as a beacon identifier 302. The profile preference is associated with the user of the cellular telephone 101. The profile preference is provided to the local business in conjunction with a notification 702 that the cellular telephone 101 is located in the proximity to the specific RF tag or beacon 102. The process can filter information to determine Location Based Services (LBS) content 704, wherein the Location Based Services (LBS) content 704 is based upon the profile

preferences of the Location Based Services (LBS), and the user's behavior 703. The system can determine Location Based Services (LBS) content 704 such as deals, offers, coupons and specials, and the like, as well as store or business information, and provide the information accordingly to the user through the user's cellular telephone 101.

[00594] A series of Local Based Service (LBS) applications that can be utilized in conjunction with infrastructure provided by the series of deployed RF beacons 102 and the methods describes according to various embodiments of the present invention is illustrated in FIG. 8. One application, referred to as Parking and Return to Parking 801, provides a method for searching for available parking spaces and/or a process for assisting a user to return to the parking location of the user's car. The Parking and Return to Parking 801 application can provide parking information within a parking garage, in a mall parking area, for street parking, and the like, wherein the Parking and Return to Parking 801 provides the user with direct navigation to empty parking spots and/or to provide the user guidance to return to the location where the car was previously parked.

[00595] In another application, Nav realty 802, information associated with real estate is provided to a user using RF tags or beacons 102 installed at each real estate property. Each RF tag or beacon 102 would provide local information about the associated real estate property and can include navigation information respective to real estate located within the local area directly to the user's cellular telephone 101.

[00596] In yet another application Navmall or store 803, information can be provided to business operators and subsequently, business related information can be provided to the application user.

[00597] In yet another application, Navsale marketing 804, sales, specials, coupons, and the like can be transmitted to the cellular telephone 101. This feature can provide directions or navigation to the user to guide the user to areas displaying items associated with the sales, specials, coupons and the like.

[00598] In yet another series of applications, Nav museum, Nav conference, Nav show 805, the RF tags or beacons 102 would be installed in known locations within a museum, a

conference center, a show (respectively) and any other related location, whereby the RF tags or beacons 102 directly or indirectly provide information and/or navigation associated with the location to the user of the associated application.

[00599] In yet another application, Car Telematics, VIN broadcasting, Automatic “waze” 807, mobile communication devices, such as the cellular telephone 101, the vehicle communication system, and the like, can be employed to create an ad hoc network, enable vehicle to vehicle communications, and the like. The RF tags or beacons 102 can be deployed along a side of a road, a cellular telephone 101 residing within a vehicle, integrated into a vehicle, and the like. When the cellular telephone 101 is mobile, the cellular telephone 101 can provide wireless vehicle-to-vehicle communication. One optional feature of this application would be an inclusion of automatic traffic notifications, what can be referred to as automatic “waze”, whereby the cellular telephone 101 can provide automatic traffic and road notifications. In an alternate embodiment, a Bluetooth enabled device can be located within a vehicle 106 (as either a fixed or a portable device), on a driver 105, on a pedestrian, and the like. The cellular telephone 101 can be included as an integral element in gathering traffic information. The system can monitor movement of the same mobile device to determine traffic flows. Vehicle telematics can be collected and conveyed to receiving parties.

[00600] In yet another application, Indoor Navigation 808, the RF tags or beacons 102 can be employed to provide an infrastructure enabling the application to determine a precise location of the receiving device. The application would additionally include a capability of providing navigation between various deployed RF tags or beacons 102. This application provides a solution in areas where the Global Positioning System (GPS) is ineffective, such as indoors. The system also eliminates a need for bidirectional communication.

[00601] In yet another application, Transportation 810, the RF tags or beacons 102 would be deployed in a subway, on a train, on a bus, and/or in any other mass transit system. This infrastructure would provide the user with information directly to their cellular telephone 101 from the deployed RF tags or beacons 102 installed at stations and/or along the routes. This gives the user a complete navigation on a map of the train or subway mass transit directly to the user's cellular telephone 101.

[00602] In an alternative mode of the Transportation Application 810, the RF tags or beacons 102 can be deployed along a side of a road, a cellular telephone 101 residing within a vehicle, integrated into a vehicle, and the like. When the cellular telephone 101 is mobile, the cellular telephone 101 can provide wireless vehicle-to-vehicle communication. One optional feature of this application would be an inclusion of automatic traffic notifications, what can be referred to as automatic “waze”, whereby the cellular telephone 101 can provide automatic traffic and road notifications. In an alternate embodiment, a Bluetooth enabled device can be located within a vehicle 106 (as either a fixed or a portable device), on a driver 105, on a pedestrian, and the like. The cellular telephone 101 can be included as an integral element in gathering traffic information.

[00603] In yet another application, Navsign 811, the RF tags or beacons 102 can be installed along a roadway at locations either proximate traffic signs or at locations exclusive of traffic signs, but would be appropriate for conveying traffic related information to a driver. Each RF beacon 102 would be installed at a location enabling passing vehicles to receive beacon signals from the deployed series of RF tags or beacons 102. The related infrastructure would provide a telematics system to the driver’s cellular telephone 101, a system integrated into a vehicle, and the like.

[00604] In yet another application, NAV Dating / Social Networking Link 812, a precise location of the cellular telephone 101 is determined using information associated with the beacon signal from the RF tag or beacon 102 that is located in a proximity of the cellular telephone or mobile device 101. The location information is then utilized to assist the user in regards to social networking as well as indoor navigation.

[00605] In yet another application, Dynamic Deployment / Local Communication 813, the application establishes an ad hoc network between a series of mobile Bluetooth enabled RF beacons, such as Bluetooth transceivers of cellular telephones 101 to provide local messaging between a message transmitting user and a message receiving user, wherein the message is conveyed through at least one intermediary Bluetooth enabled RF beacon.

[00606] In yet another application, Payments 814, a payment transaction method can utilize a location determined by the proximity of the cellular telephone 101 to an RF tag or beacon 102 of

the series of RF tags or beacons 102. The location, the identification of the RF beacon 102 and/or the user profile can be associated with the payment.

[00607] In yet another application, Notification or Automatic Check-In 815, the cellular telephone 101 is directed to automatically transmit an arrival message, which notifies a recipient that the cellular telephone 101 has received a beacon signal from an RF tag or beacon 102 included within the infrastructure of beacons and that the cellular telephone 101 is in proximity of the RF tag or beacon 102. The application can additionally consider elements of the user's profile when determining whether to send the arrival message and/or what is included in the arrival message.

[00608] In yet another application, Nav Hotel, Nav Resort, Nav Cruise Ship 816, the RF tags or beacons 102 can be deployed within a hospitality environment to provide an infrastructure enabling the application to determine a precise location of the receiving device within the hospitality environment or venue. Since most of the environments of the hospitality venues are located indoors, this application provides a solution in areas where the Global Positioning System (GPS) is ineffective. Additionally, the Nav Hotel, Nav Resort, Nav Cruise Ship 816 application can automatically initiate Location Based Services (LBS) associated with the hospitality environment. The Nav Hotel, Nav Resort, Nav Cruise Ship 816 application can also automatically initiate a link to services associated with the hospitality environment. The Location Based Services (LBS) and the links can be automated based upon the determined location of the receiving device, such as a mobile device or a cellular telephone 101. The location of the receiving device can be determined by the identification (ID) of the beacon signal from the RF tag or beacon 102 located proximate the receiving device.

[00609] In yet another application, Scanning For Life 817, the cellular telephone 101 converts into a beacon in a condition where two direction communication networks are unavailable by either lack of installation or an outage. The cellular telephone 101, acting as a beacon, repetitiously transmits a beacon signal using at least one of a cellular transmission, a Bluetooth transmission, and a Wi-Fi transmission. Search and rescue parties would utilize a portable receiver to scan for and locate the Scanning for Life beacon signal. The Scanning For Life 817 application can include location based functions, wherein the location is determined from beacon

signals received from RF tags or beacons 102 deployed in the area. The beacon signal would include a beacon identification (ID), which includes information pertaining to the known location of the respective RF tag or beacon 102. The beacon signal can optionally include embedded information associated with the cellular telephone 101, which can include specific information associated with the user of the cellular telephone 101, location information, and the like.

[00610] In yet another application, Nav emergency 818, the RF tags or beacons 102 provide critical information and/or navigation to the user during an emergency event including instructions pertaining to an emergency procedure, an emergency evacuation map and directions for evacuating the facility to a safe location.

[00611] Additionally, the Nav Emergency 818 application utilizes the RF tags or beacons 102 to provide navigation to the cellular telephone 101 from the current location of the cellular telephone 101 to an exit location in accordance with a predetermined, optimal emergency exit route. The location and routing would be based upon the initial location, which is determined by a proximity to an RF tag or beacon 102 of the localized RF beacon infrastructure. The application can additionally provide an emergency procedure and any other necessary notifications to the user through the user's cellular telephone 101.

[00612] In yet another application, Nav amusement or Nav park 819, the RF tags or beacons 102 would be installed in known locations about any amusement park, theme park, or other entertainment venue, whereby the RF tags or beacons 102 directly or indirectly provide information and/or navigation associated with the respective venue to the user of the application. The application can be enhanced by including an optional feature to assist a user in reducing wait times, such as a virtual queuing process, for access to rides, events, shows, and the like.

[00613] It is noted that the RF beacon infrastructure enables execution of the above-described application exclusive of cellular communications and/or access to the Internet.

[00614] An exemplary indoor infrastructure of RF beacons 102, wherein the RF tags or beacons 102 are installed in known locations throughout a local area, as presented in FIG. 9. Each RF tag or beacon 102 broadcasts at least one of a Bluetooth signal and a Wi-Fi signal. The

RF tags or beacons 102 enable an application to determine a precise location of the cellular telephone 101 on a local map 200. Once the application determines the location of the cellular telephone 101 relative to a proximate RF tag or beacon 102, the application can utilize a user's profile or profile preferences to obtain marketing information. The user's profile or profile preferences can be used to filter information provided to the cellular telephone 101. The application can provide information to a remote recipient using Application Programming Interface (API) 901 which would trigger or initiate content delivery 604. When triggering content delivery 604, a 3rd party application 903 would respond to the transmission directed by the application by conveying or pushing local content or other associated information 902 to the cellular telephone 101. The bi-directional communication can be accomplished using cellular communication, an ad hoc network, an Internet based communication, and the like. In another embodiment, the remote recipient can include a local business owner or operator, thus notifying the business owner or operator that the specific cellular telephone 101 is in a vicinity of the business.

[00615] A series of transportation based applications, introduced in FIG. 10, can be utilized in conjunction with infrastructure provided by the series of fixed or dynamically deployed RF beacons 102 and the methods described according to various embodiments of the present invention. A portion of the applications introduce telematics therewith.

[00616] In one application, referred to as a Trigger Application 1102, the system identifies an RF tag or beacon 102, which subsequently triggers or initiates an application. The triggering can be based upon the location of the cellular telephone 101. The location can be determined by the identification (ID) of the RF tag or beacon 102 located proximate the cellular telephone 101. Additional accuracy can be provided by using the signal strength of the beacon signal from the RF tag or beacon 102 located proximate the cellular telephone 101 or using triangulation when receiving two or more beacon signals from the RF tags or beacons 102 located proximate the cellular telephone 101.

[00617] A second application, referred to as Automatic Traffic Alert 1103, provides beacon signals comprising telematics including traffic alerts. The traffic alerts can be included in the naming portion of the beacon signal. Using this application, a driver 105 can employ their

cellular telephone 101 to deliver automatic traffic information 1103 into the system. The system can employ mobile devices 101 that are traveling in vehicles to determine traffic flow. The traffic flow can then be disseminated to other users by way of their mobile devices 101.

[00618] In another application, referred to as Dynamic Deployment 1104, an ad hoc network is created between vehicles providing vehicle to vehicle communication using an intermediary communication link. The vehicle to vehicle communication is preferably accomplished using a Bluetooth protocol.

[00619] In yet another application, referred to as Find Parking and Return to Parking 1105, the RF beacon infrastructure is used to inform a user of vacant and available parking locations and/or provide navigation guiding the user to the location where the user parked their vehicle.

[00620] In yet another application, referred to as Local Tracking 1106, the system utilizes a Bluetooth beacon that can recognize the car and/or driver identification (ID) and subsequently track the car and/or driver. The car identification can be the vehicle identification number or VIN.

[00621] In yet another application, referred to as Access Control 1107, recognition of either a proximate RF tag or beacon 102 or an approaching cellular telephone 101 causes activation of a device. This can be accomplished using any of many suitable processes. For example, when a vehicle is approaching a gate, the vehicle would receive a beacon signal from a local RF tag or beacon 102. The signal would be deciphered to determine the identity of the RF tag or beacon 102. Once known, the system would act according a directive that is associated with the identity of the proximate RF tag or beacon 102. In one example, the system would transmit a signal to open the gate when the vehicle approaches the gate.

[00622] In yet another application, referred to as Saving Fuel 1108, the application or series of applications can reduce fuel consumption by optimize navigation, reducing time finding parking spaces, provide telematics associated with traffic, provide management support of transportation systems, and the like.

[00623] In yet another application, referred to as Theft Prevention 1109, the RF tag or beacon 102 would recognize the vehicle and prevent theft.

[00624] In yet another application, referred to as Transportation Management 1110, the RF tags or beacons 102 provide assistance for management of transportation systems.

[00625] In yet another application, referred to as Accident Prevention 1111, the cellular telephones are employed as mobile RF beacons 101 provide assistance for prevention of accidents. In one example, the beacons can be used to notify a user when two mobile RF beacons 101 become too close to one another.

[00626] In yet another application, referred to as Nav Sign 1112, the RF tags or beacons 102 can convey information associated with road signs. The RF tags or beacons 102 would be deployed along a roadway, located proximate to signs. The RF tags or beacons 102 would transmit beacon signals containing sign information within the naming portion of the beacon signal. The naming portion can be decoded when received by a mobile receiving device, such as a vehicle system or a cellular telephone 101 and conveyed to the user.

[00627] In yet another application, provided as a Global Positioning System (GPS) add-on, referred to as Navigation 1113, the series of RF tags or beacons 102 can be used to determine a location of a receiving device, such as the cellular telephone 101 or another mobile device, and can additionally be used to obtain and provide navigation. This is particularly beneficial in areas where the Global Positioning System (GPS) is ineffective, such as within an indoor environment. The navigation can utilize a location recognition process wherein the location of the mobile device 101 is determined using the identification (ID) of the RF tags or beacons 102. The identification (ID) of the RF tags or beacons 102 are embedded into the naming portion of the beacon signal. The receiving device 101 decodes the beacon signal to determine the identification (ID) of the signal received from the RF tag or beacon 102 located proximate to the receiving device 101. The identification (ID) of the RF tag or beacon 102 includes the known location. The decoded identification (ID) is used to determine the location of the receiving device 101. Additionally, signal strength of the beacon signal and/o triangulation can be employed to further refine the accuracy of the location.

[00628] A series of navigation based applications that can be utilized in conjunction with infrastructure provided by the series of deployed RF beacons 102 and the methods described according to various embodiments of the present invention are illustrated in schematic form

shown in FIG. 11. Each RF tag or beacon 102 contains and broadcasts a beacon signal comprising a beacon identifier (ID) to enable a receiving device 101 to determine a precise location of the device within a facility, a mall, a show, a store, and the like. The RF tags or beacons 102 would broadcast a beacon signal using at least one of Bluetooth and Wi-Fi protocol. At least a portion of the RF tags or beacons 102 can be associated with a waypoint.

[00629] Each of the series of exemplary applications provides a location determining solution and navigation in an environment that is not conducive for the Global Positioning System (GPS), such as within a mall, a store, a parking garage, and any other indoor location.

[00630] One application, referred to as Parking and Return to Parking 1510, the RF tags or beacons 102 are deployed in a parking area. Each RF tag or beacon 102 includes at least one sensor to determine a presence or absence of a vehicle in the associated parking spot. The RF tags or beacons 102 identify vacant parking spots and provide navigation to each vacant parking space to a user. The application can additionally or alternatively provide navigation directing the user to the parking space containing their vehicle.

[00631] In a second application, referred to as Stores Directory 1520, a directory of merchants is provided to the cellular telephone 101. The directory can include displaying locations of the merchants on a local map 200.

[00632] In another application, referred to as Search and Find 1111, the RF beacon infrastructure is used to provide directions or navigation between known waypoints within an indoor facility, such as a mall. The known waypoints would be displayed upon the indoor map 200.

[00633] In yet another application, referred to as Entertainment 1530, the network provides information pertaining to entertainment to the receiving device 101. The entertainment can be associated with a location of the receiving device 101, wherein the location would be determined by a proximity to an RF tag or beacon 102. The application can additionally provide navigation to a location associated with the entertainment.

[00634] In yet another application, referred to as Sales, Deals, and Specials 1540, the network provides information pertaining to sales, deals, specials, and the like to the receiving device 101.

The sales, deals, specials, and the like can be associated with a location of the receiving device, wherein the location would be determined by a proximity to an RF tag or beacon 102.

[00635] In yet another application, referred to as Emergency1560, the network provides a notification of an emergency situation, emergency procedural information, and navigation from the current location, through the structure, and to a predetermined exit location. The information would be respective to the proximate RF tag or beacon 102.

[00636] In yet another application, referred to as Dining 1580, the network provides information pertaining to dining in the local area to the receiving device. The dining information can be associated with a location of the receiving device 101, wherein the location would be determined by a proximity to an RF tag or beacon 102. The application can additionally provide navigation to a dining location. This can include restaurant types, menus, and the like.

[00637] In yet another application, referred to as Information and Events 1590, the network provides information pertaining to events to the receiving device. The events can be associated with a location of the receiving device, wherein the location would be determined by a proximity to an RF tag or beacon 102. The application can additionally provide navigation to a location associated with each event.

[00638] An exemplary flow diagram illustrating a next generation of marketing tools utilizing the RF beacon 102 infrastructure deployed in a local area is presented in FIG. 12. The network obtains a user's profile or preferences 701 as well as a user's behavioral pattern 704 associated with the user's cellular telephone 101. The information is conveyed to a business owner 702 for marketing purposes. The user's profile and/or preferences are filtered to determine applicable Location Based Services (LBS) 703. The information can trigger or initiate an application 304, establish a link to an existing system and software, and the like, to provide at least one of local content 503 and indoor navigation 108 to the cellular telephone 101 or similar receiving device.

[00639] An exemplary schematic diagram illustrating a method of utilizing dynamic deployment to create an ad hoc network is presented in FIG. 13. Exemplary applications include vehicle-to-vehicle communication, emergency communications, local communications, and the like. The method establishes communication between a series of Bluetooth devices located

proximate one another. One exemplary implementation employs cellular telephones 101, utilizing the Bluetooth transceivers integrated therewith. The dynamic network is created by placing proximally located Bluetooth devices into an ad hoc or mesh network. The network is based upon overlapping signal transmission radii, as shown. The network can include installed or stationary Bluetooth devices 106 and/or mobile Bluetooth devices 101, exclusive of cellular or other higher powered and costly communication interfaces. The method can be utilized in transportation creating a road size networking of vehicles and/or drivers for telematics or traffic information, a push alert providing road information, and creating a vehicle-to-vehicle communication capability. In another option, the network can be utilized in an emergency situation; more specifically, when and where the cellular network is unavailable, interrupted, down, or fail. The ad hoc network creates a longer range communication capability utilizing local low power Bluetooth and/or Wi-Fi enabled devices to convey information to local emergency responders or other parties. Another optional feature of the dynamic deployment enables creation of an ad hoc network within a structure, a mall, a store, a building, an office, an entertainment complex, and the like, exclusive of cellular communication. The ad hoc network provides capability for local messaging between users in a proximity area. The network can be utilized to deliver local content to the cellular telephone 101 exclusive of any broader and higher powered communication networks, such as cellular, and the like. The network would be applicable between cellular telephones 101 vehicles comprising the appropriate transceiver technology 106, within a facility, a building, an area, and the like. Additional information can be provided through the Internet or any other resource 1001.

[00640] The above-described embodiments are merely exemplary illustrations of implementations set forth for a clear understanding of the principles of the invention. Many variations, combinations, modifications or equivalents may be substituted for elements thereof without departing from the scope of the invention. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all the embodiments falling within the scope of the appended claims.

CLAIMS

What is claimed is:

1. A method of utilizing at least one beacon for conveying desired information, the method comprising steps of:

integrating a Radio Frequency (RF) beacon into a vehicle, the RF beacon being a communication device configured to transit a beacon signal detectable by a baseband subsystem of a mobile device located within a communication range of the respective beacon;

encoding desired information in a naming packet of a beacon signal;

broadcasting the encoded desired information in the naming packet of the beacon signal; and

decoding the encoded desired information and authorizing a wireless scanning device; and

utilizing the decoded encoded desired information to initiate at least one of telematics and location base services (LBS) applications.

2. The method as recited in claim 1, further comprising a step of:

the RF beacon utilizing at least one of (a) a long range Bluetooth signal (a wireless communication protocol standard using short-wavelength radio waves in the ISM band from 2.4 to 2.485 GHz in accordance with industry standard IEEE 802.15) and (b) a Wi-Fi signal (a local area wireless technology that allows an electronic device to exchange data or connect to the internet using 2.4 GHz UHF and 5 GHz SHF radio waves in accordance with industry standard IEEE 802.11).

3. The method as recited in claim 1, further comprising a step of:

encoding the one of a vehicle identification reference (ID) or a vehicle identification number (VIN) number in the naming packet of the at least one of a long range Bluetooth signal and the Wi-Fi signal.

4. The method as recited in claim 1, further comprising a step of:

interfacing the Radio Frequency (RF) beacon with a vehicle computer.

5. The method as recited in claim 1, wherein the step of integrating the Radio Frequency (RF) beacon into a vehicle is accomplished by a vehicle manufacturer during a process of manufacturing the vehicle.

6. The method as recited in claim 1, wherein the step of integrating a Radio Frequency (RF) beacon into a vehicle is accomplished as an aftermarket installation process, wherein the aftermarket installation process is accomplished following completion of a manufacturing process of the vehicle.

7. The method as recited in claim 1, further comprising a step of:

initiating at least one of the following processes:

automatically initiating a Location Based Service (LBS) application,

automatically initiating telematics,

serve as a locating engine,

enables automatic payment,

enables automatic payment for at least one of gas, a roadway toll, and parking,
supplements an existing Global Positioning System (GPS),
supplements an existing navigation system,
enables access control,
enables access control for at least one of opening of a gate, opening of a garage door, and replacing a key,
enables vehicle to vehicle communication,
locating a vacant parking space,
locating a parked vehicle,
create a geofence around the vehicle,
inform a user of information associated with roadway signs,
assist emergency services in locating at least one of an individual and an article,
contributes to a dynamic communication network,
provides communication of information for a transportation management system,
acts as a theft deterrent, and
contributes to an alarm and notification system.

8. The method as recited in claim 1, wherein the beacon is in signal communication with a sensor, further comprising a step of:

triggering an operation associated with the sensor.

9. The method as recited in claim 1, the beacon further comprising a Near Field Communication (NFC) transceiver, further comprising a step of:

employing the NFC transceiver for communicating between the beacon and a second device comprising a like NFC transceiver.

10. The method as recited in claim 1, further comprising a step of:

defining a geofence using the beacon;

automatically initiating an event when a mobile device in signal communication with the beacon travels to a location outside of the geofence, where the mobile device is out of signal range of the beacon.

11. The method as recited in claim 1, further comprising a step of:

defining a geofence using the beacon;

defining a geofence using the Bluetooth transceiver; and

automatically initiating transmission of an alerting message when a mobile device in signal communication with the Bluetooth transceiver travels to a location outside of the geofence, where the mobile device is out of signal range of the Bluetooth transceiver.

12. A method of utilizing a Bluetooth transceiver for conveying desired information, the method comprising steps of:

employing the Bluetooth transceiver integrated within a vehicle, the Bluetooth transceiver configured to transmit a Bluetooth signal detectable by a Bluetooth circuit of a mobile device located within a communication range of the respective Bluetooth transceiver;

registering an exact parking space location of the vehicle on the mobile device using information provided by the Bluetooth transceiver; and

subsequently using the mobile device to provide navigation to the parking space location where the vehicle is parked.

13. The method as recited in claim 12, further comprising a step of:

displaying on a display of the mobile device, a map between a current location of the mobile device and the exact parking space location of the vehicle.

14. The method as recited in claim 12, further comprising steps of:

defining a geofence using the Bluetooth transceiver, wherein the Bluetooth transceiver is a communication device configured to provide a signal detectable by a baseband subsystem of a mobile device located within a communication range of the respective Bluetooth transceiver; and

informing a user when the mobile device travels outside of the geofence:

15. The method as recited in claim 12, further comprising a step of:

employing a Global Positioning System (GPS) to register the location of the exact parking space location of the vehicle.

16. The method as recited in claim 12, further comprising steps of:

employing a Global Positioning System (GPS) to register a location of the vehicle;
and

subsequently using the registered location of the vehicle to provide navigation to the parking space location where the vehicle is parked.

17. The method as recited in claim 12, further comprising steps of:

employing a Global Positioning System (GPS) to register a location of the vehicle;
and

displaying on a display of the mobile device, a map between a current location of the mobile device and the registered location of the vehicle.

18. The method as recited in claim 12, further comprising steps of:

employing a Global Positioning System (GPS) to register a location of the vehicle;

displaying on a display of the mobile device, a map between a current location of the mobile device and the registered location of the vehicle; and

providing navigation from the current location of the mobile device and the registered location of the vehicle.

19. The method as recited in claim 12, further comprising a step of:

defining a geofence using the Bluetooth transceiver;

automatically initiating an event when a mobile device in signal communication with the Bluetooth transceiver travels to a location inside of the geofence, where the mobile device comes within signal range of the Bluetooth transceiver.

20. The method as recited in claim 12, further comprising a step of:

defining a geofence using the Bluetooth transceiver;

automatically initiating an event when a mobile device in signal communication with the Bluetooth transceiver travels to a location outside of the geofence, where the mobile device is out of signal range of the Bluetooth transceiver.

21. The method as recited in claim 12, further comprising a step of:

defining a geofence using the Bluetooth transceiver; and

automatically initiating transmission of an alerting message when a mobile device in signal communication with the Bluetooth transceiver travels to a location outside of the geofence, where the mobile device is out of signal range of the Bluetooth transceiver.

VEHICLE BEACON AND METHOD OF USE

Abstract

Installation of a Bluetooth and/or Wi-Fi enabled RF beacon within a vehicle. The RF beacon can be utilized to direct a user to a parking space where the user parked the vehicle. The return to parking feature can provide navigation from a current location of the user to the vehicle parking space. Navigation can be accomplished using a Global Positioning System (GPS), a beacon navigation system, or a combination thereof. The RF beacon can be utilized as a geofence. The geofence can provide several functions, such as a reminder to collect one or more items from the vehicle when the user travels outside of the geofence; automatically register the parking space where the vehicle is parked; automatically initiate a Location Based Service, and the like.

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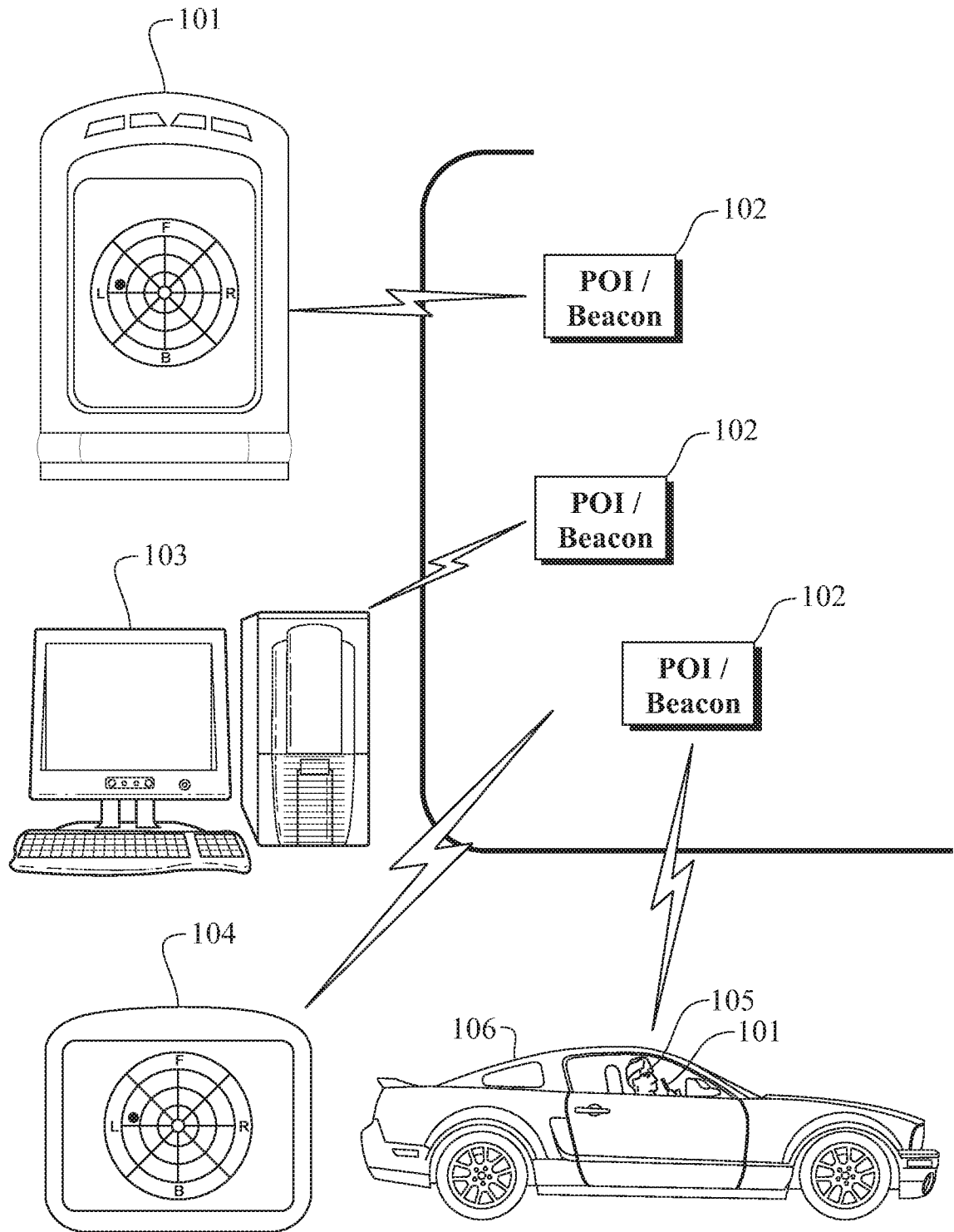


FIG. 1

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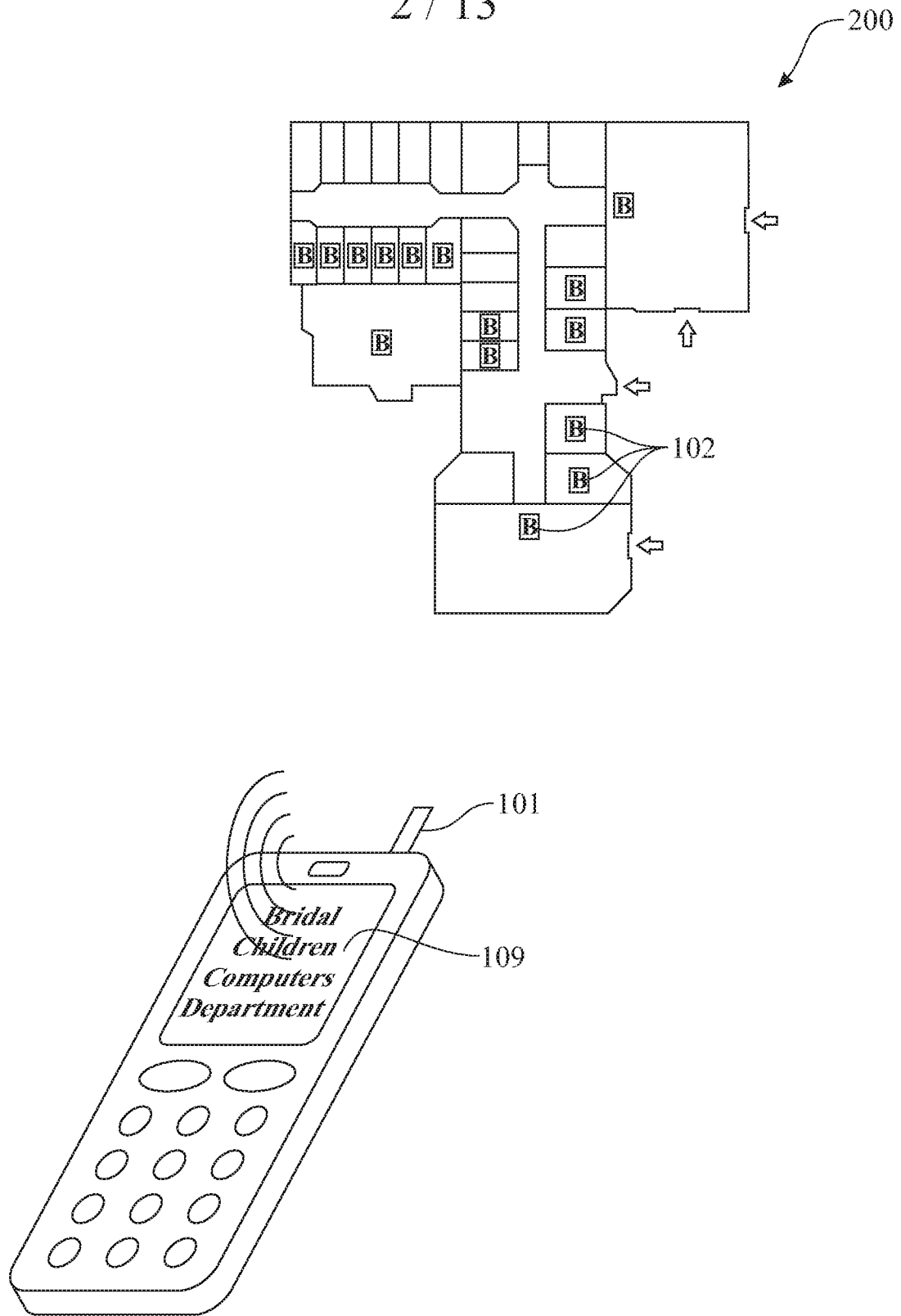


FIG. 2

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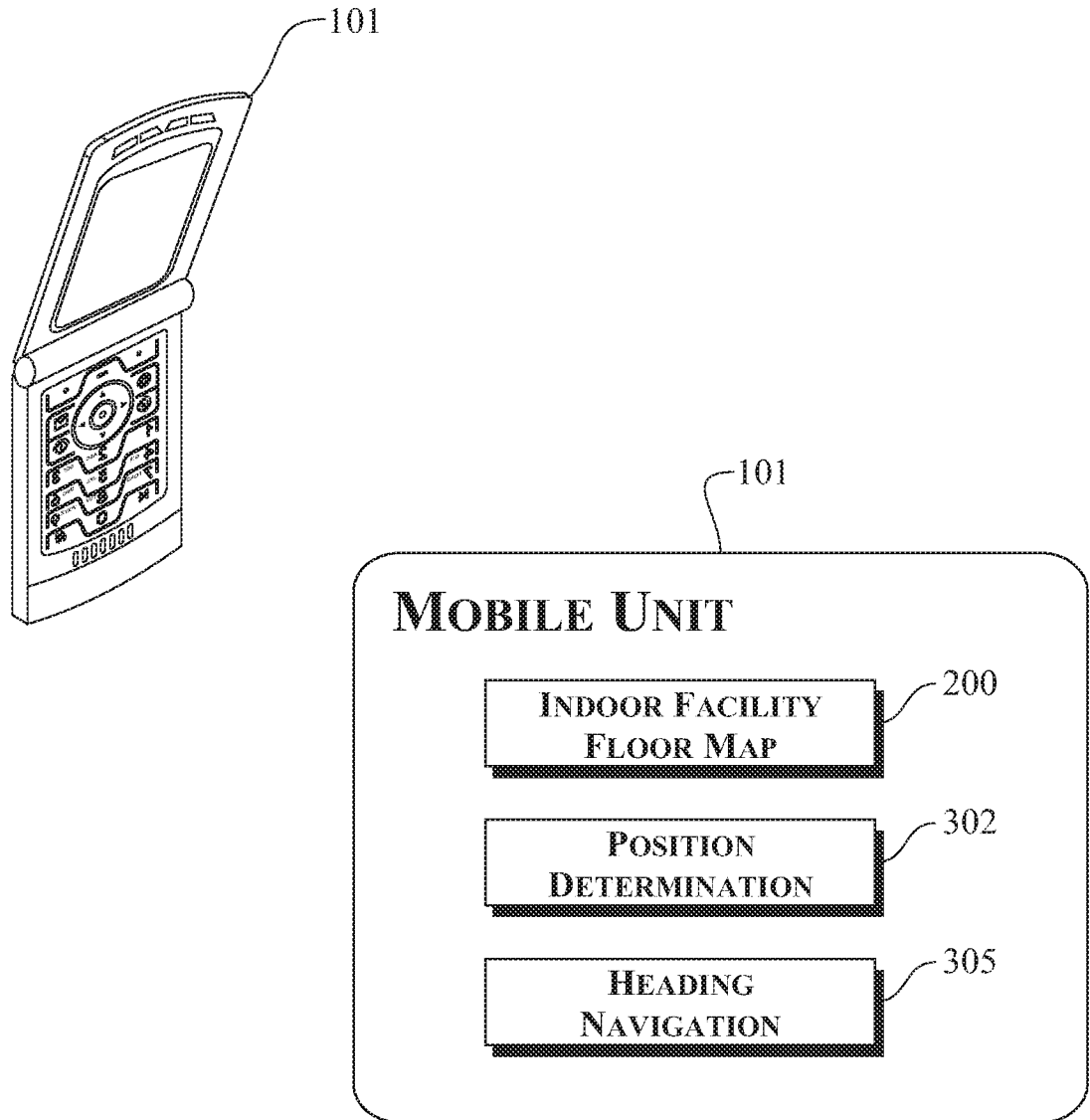


FIG. 3

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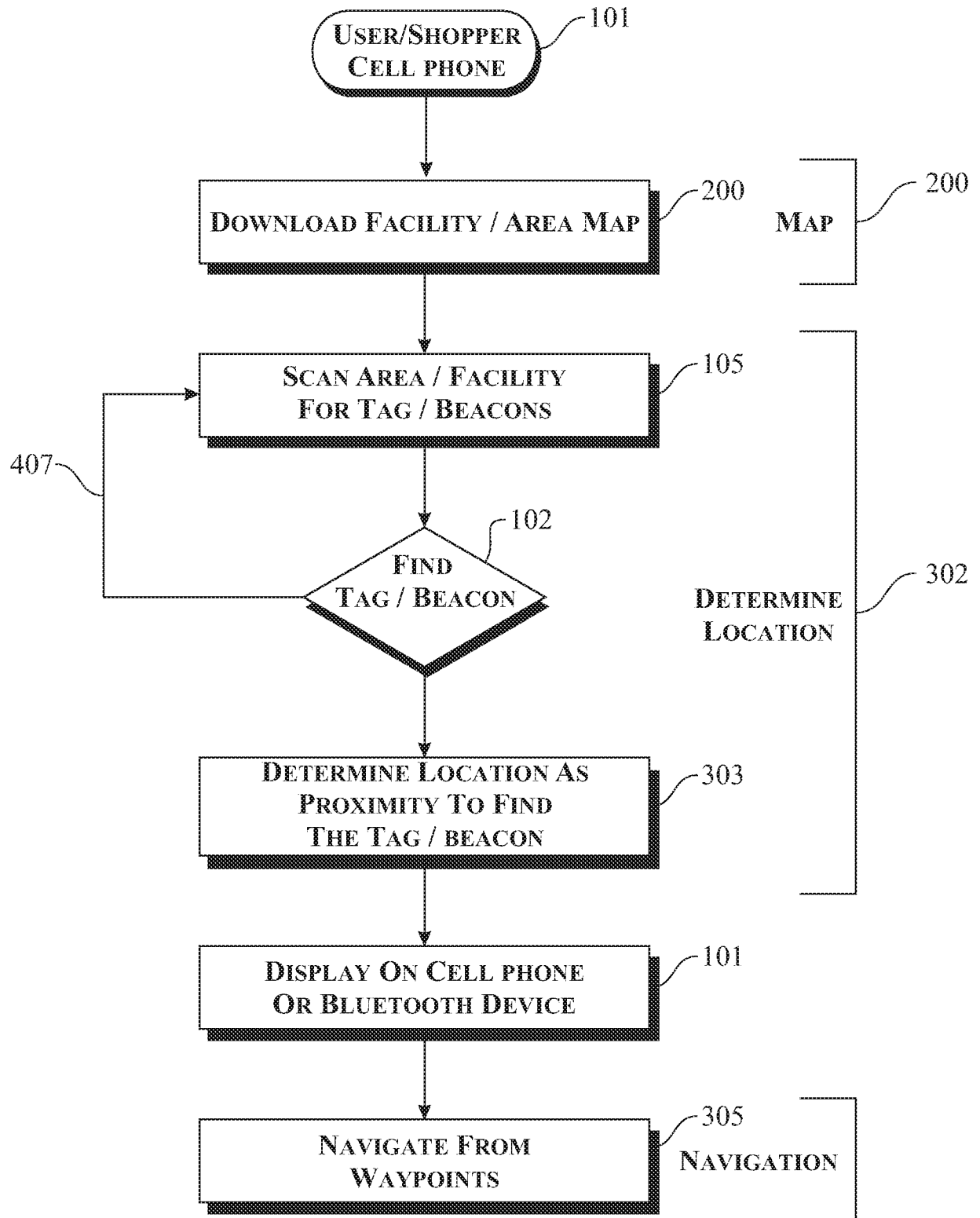


FIG. 4

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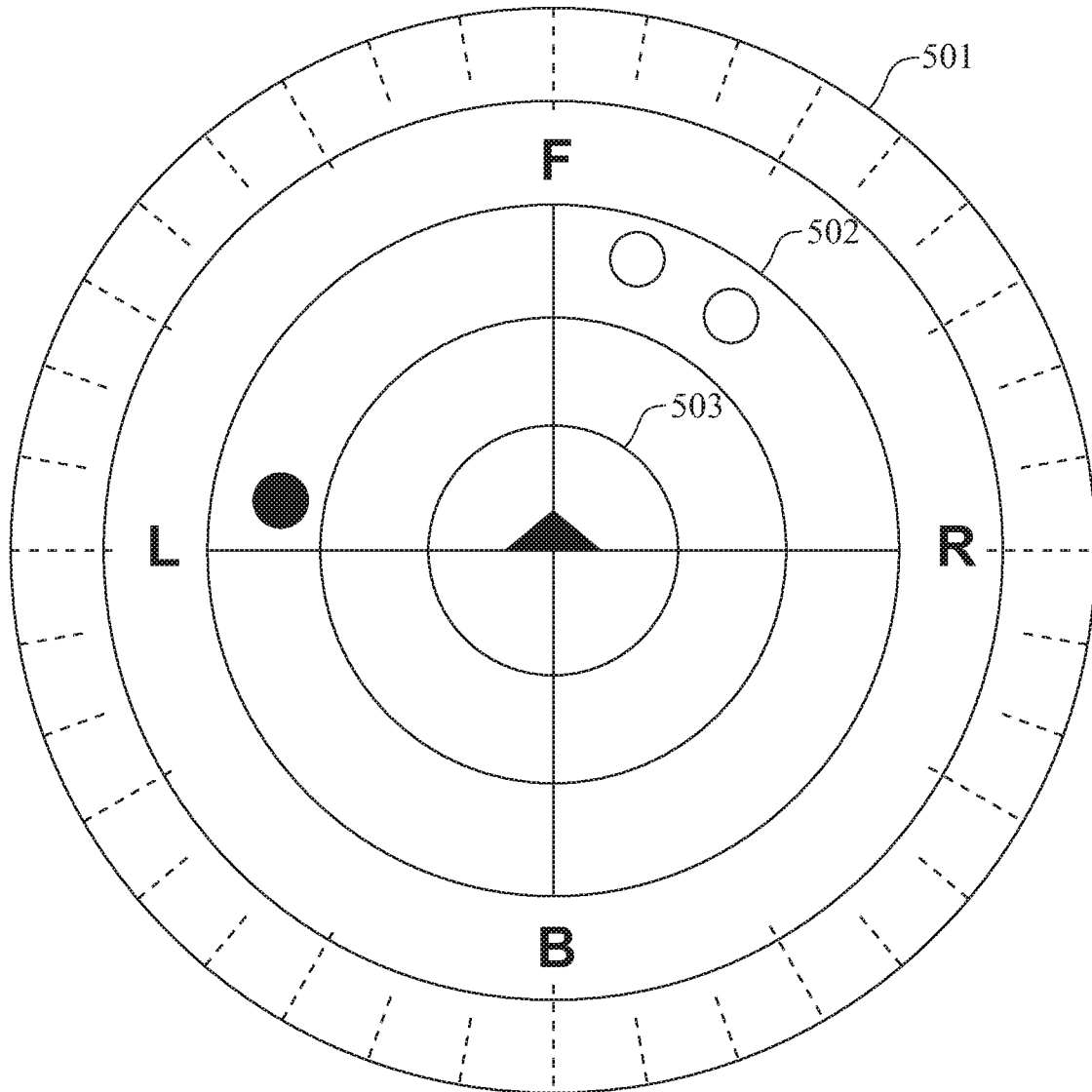


FIG. 5

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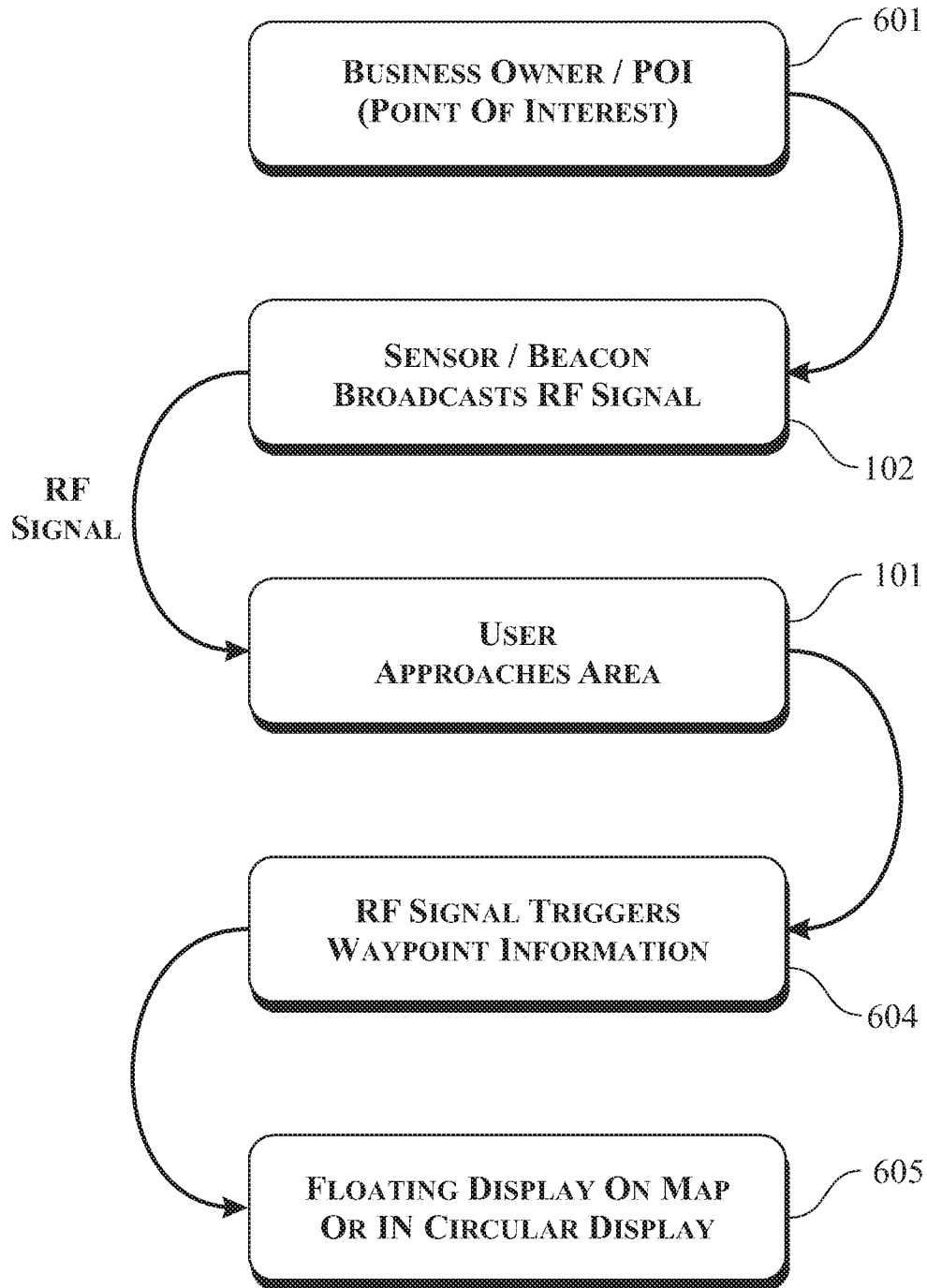


FIG. 6

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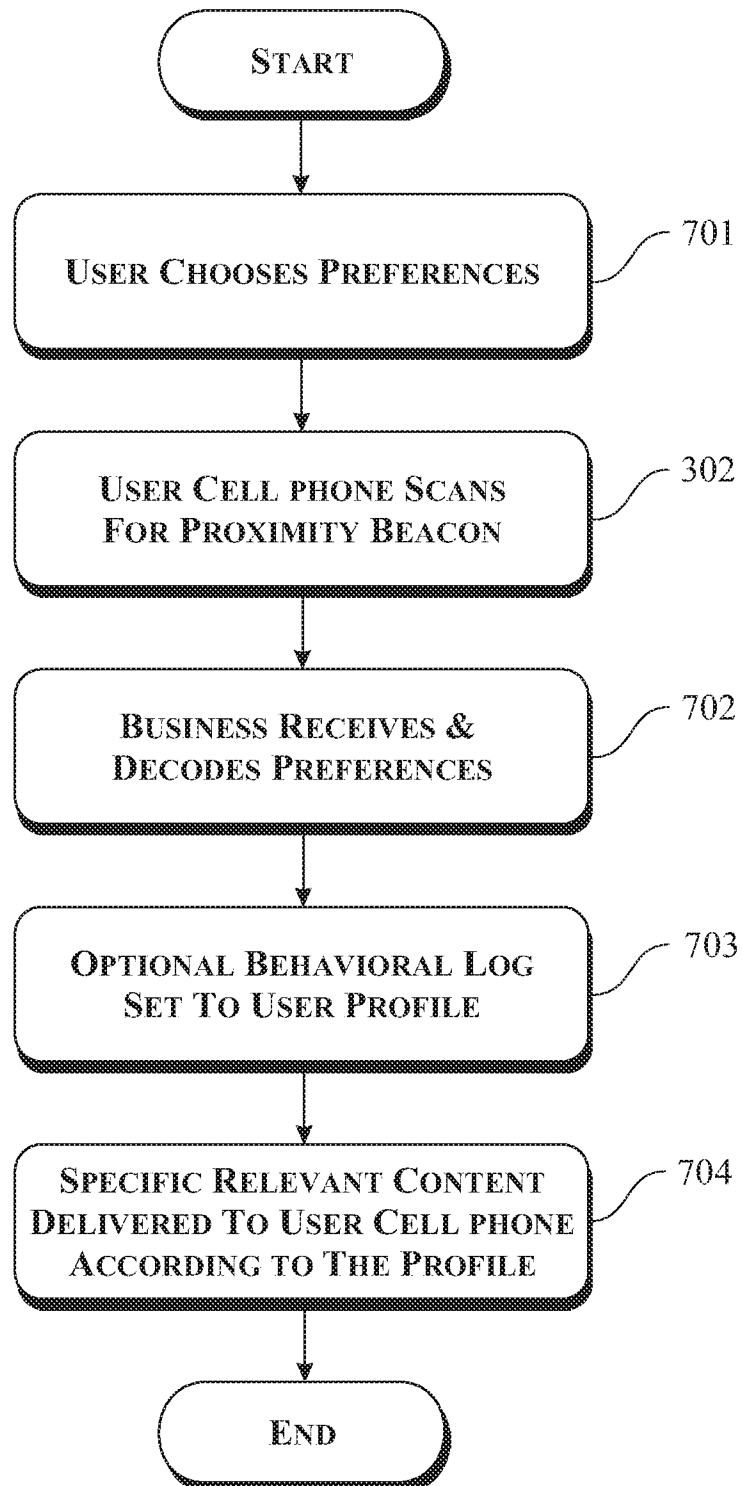


FIG. 7



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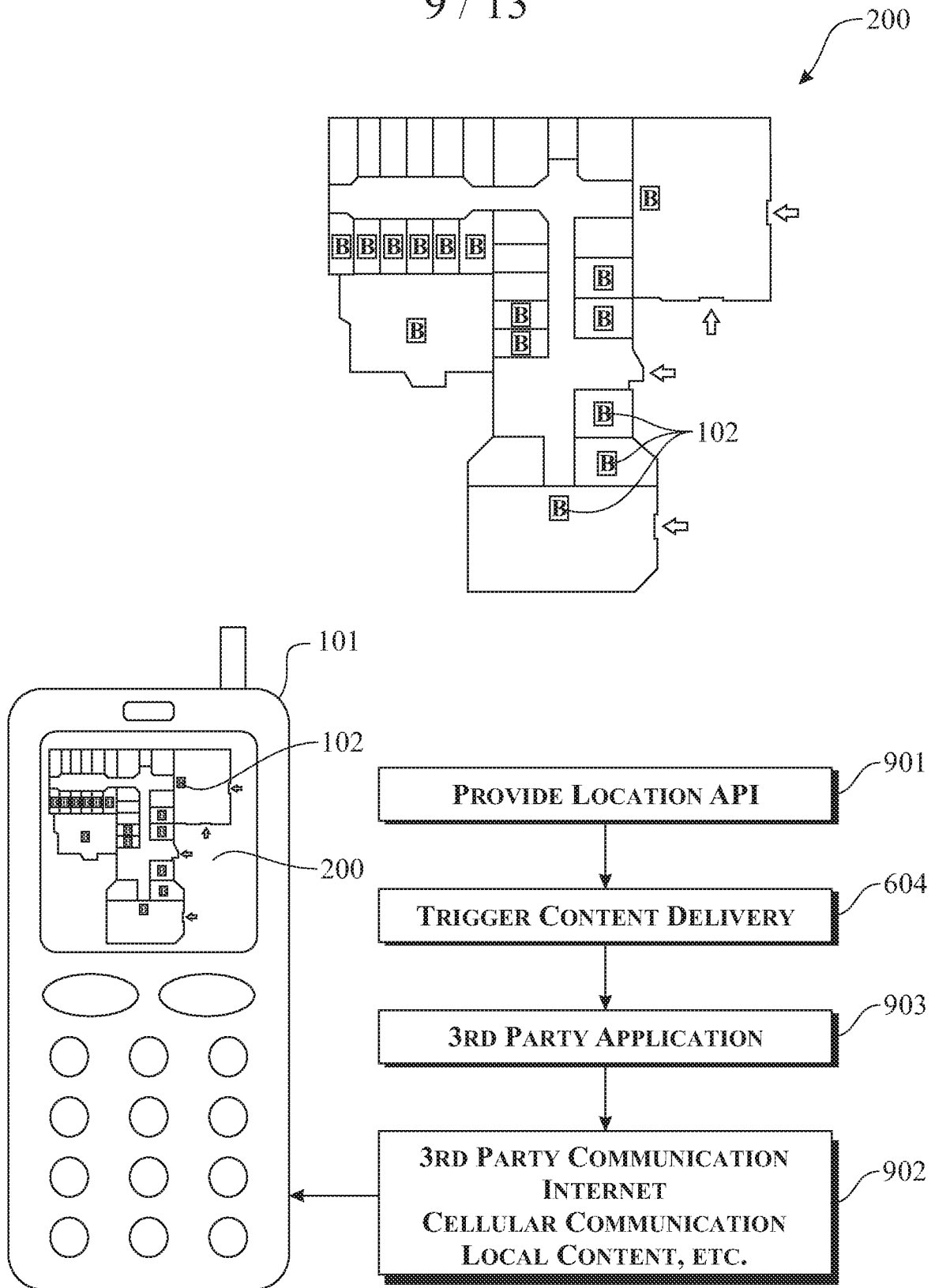


FIG. 9

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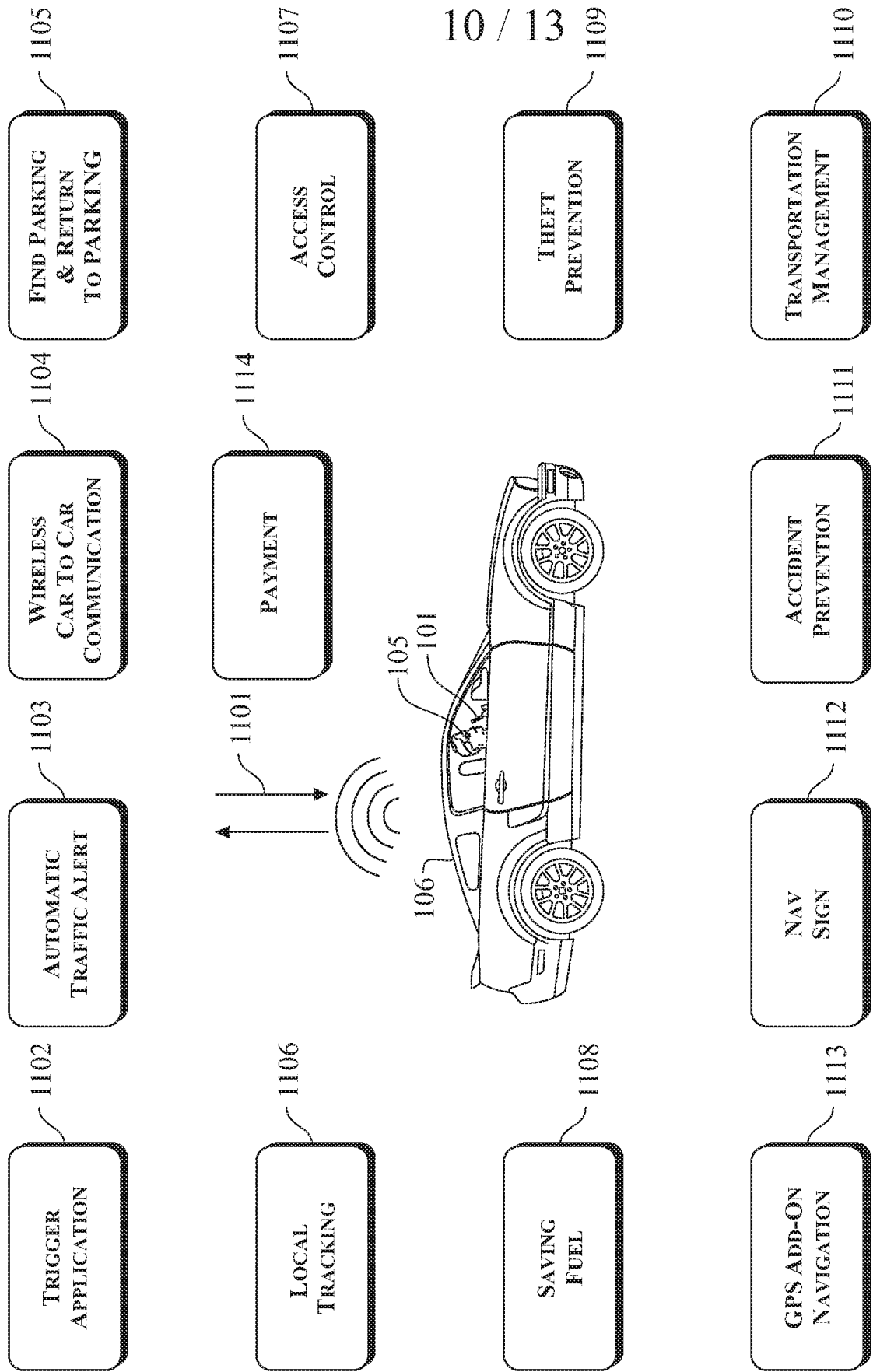


FIG. 10

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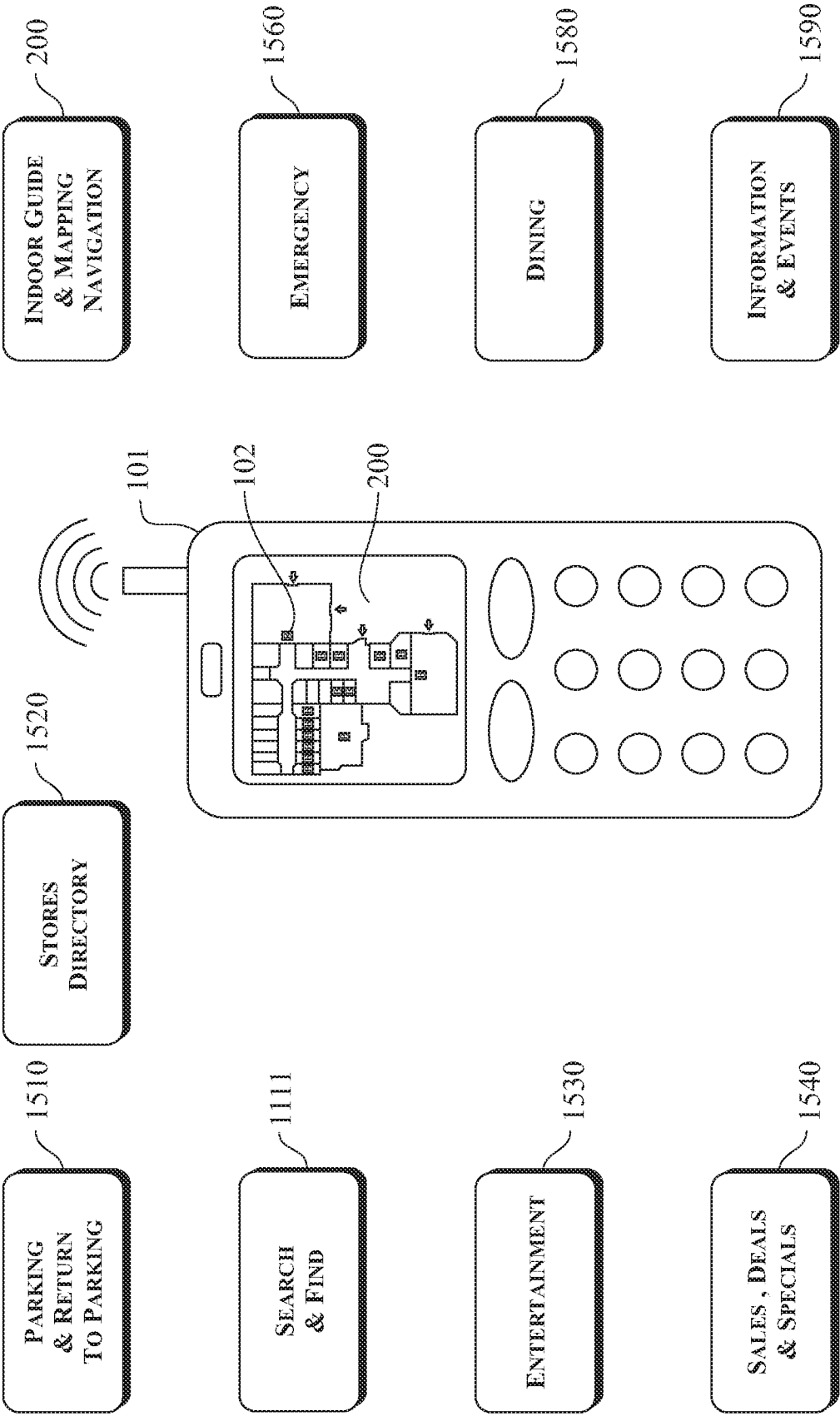


FIG. 11

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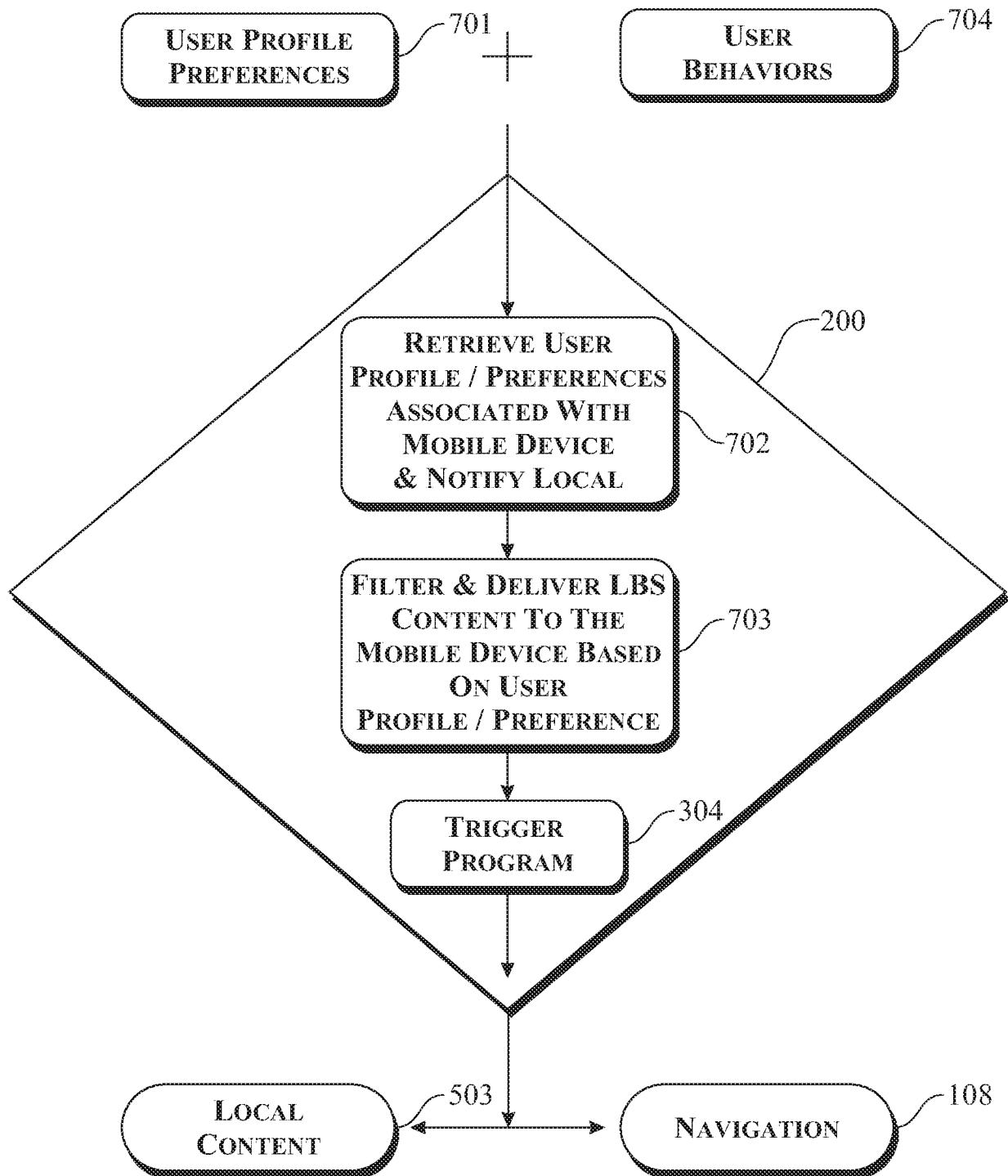


FIG. 12

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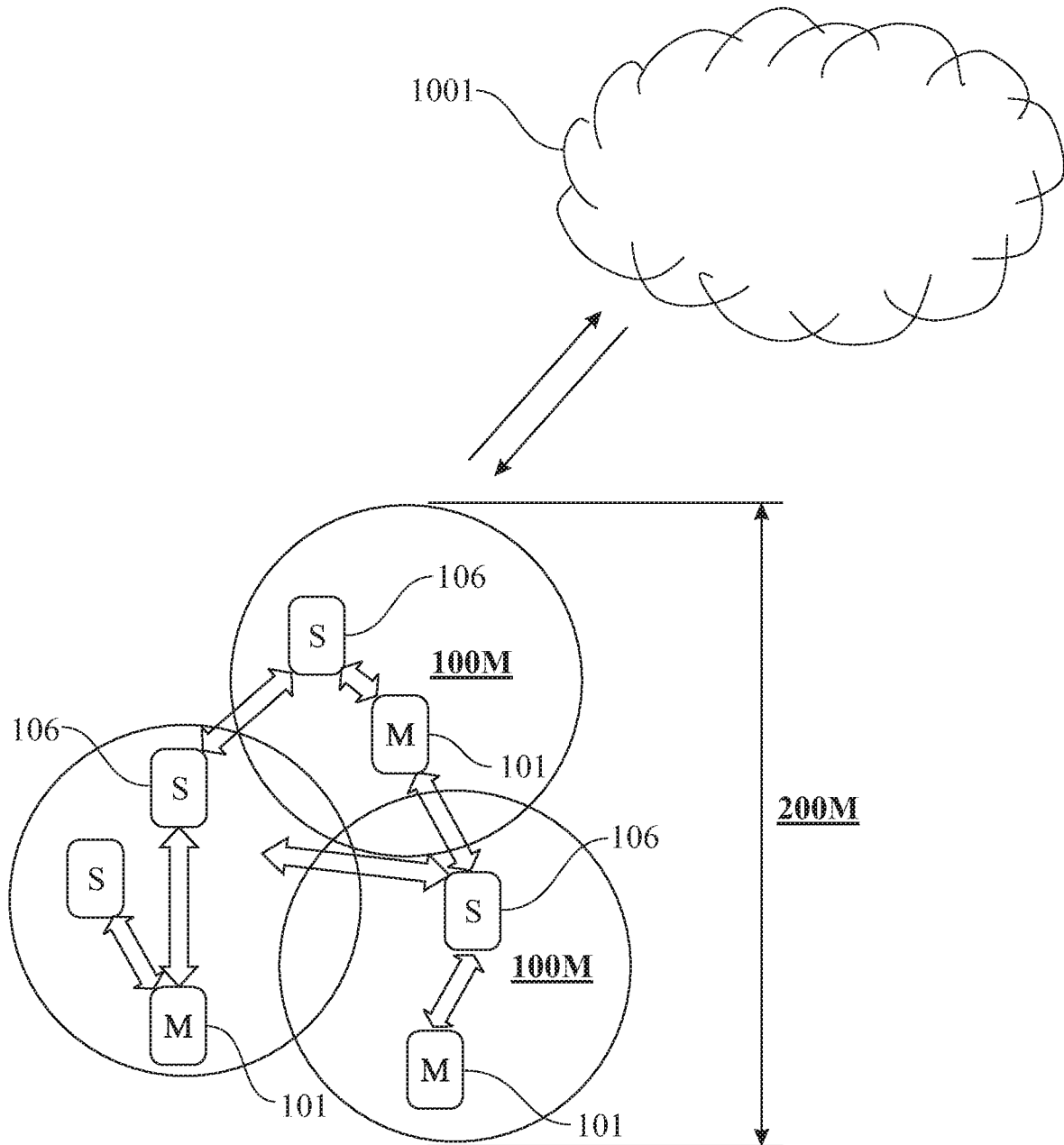


FIG. 13

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	VEHICLE BEACON AND METHOD OF USE			
First Named Inventor/Applicant Name:	Ehud MENDELSON			
Filer:	Allen D. Hertz			
Attorney Docket Number:	MEN-17-002			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360
Pages:				
UTILITY APPL SIZE FEE PER 50 SHEETS >100	2081	1	200	200
Claims:				
CLAIMS IN EXCESS OF 20	2202	1	40	40
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				970

Electronic Acknowledgement Receipt

EFS ID:	28028563
Application Number:	15403146
International Application Number:	
Confirmation Number:	4885
Title of Invention:	VEHICLE BEACON AND METHOD OF USE
First Named Inventor/Applicant Name:	Ehud MENDELSON
Customer Number:	31877
Filer:	Allen D. Hertz
Filer Authorized By:	
Attorney Docket Number:	MEN-17-002
Receipt Date:	10-JAN-2017
Filing Date:	
Time Stamp:	22:21:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$970
RAM confirmation Number	011117INTEFSW22221900
Deposit Account	506593
Authorized User	Allen Hertz

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37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		0_MEN-17-002_Mendelson_Car_Beacon_Complete_01-10-17.pdf	5297951	yes	188
			2a71d88f9a8abc3d0d7db694c963234d10c56734		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal of New Application		1	1	
	Oath or Declaration filed		2	2	
	Application Data Sheet		3	13	
	Power of Attorney		14	15	
	Information Disclosure Statement (IDS) Form (SB08)		16	20	
	Foreign Reference		21	49	
	Nonpublication request from applicant		50	50	
	Specification		51	167	
	Claims		168	174	
	Abstract		175	175	
	Drawings-only black and white line drawings		176	188	
	Warnings:				
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38164	no	2
			74f3d96c657feca2664dede73d629c6ba4684996		
Warnings:					
Information:					
Google Ex. 1013, p. 245					

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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